The Iron Age

A Review of the Hardware and Metal Trades.

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Fire Bricks from Cheltenham.

Cheltenham is a station on the Missouri Pacific Railroad, about three miles from St. Louis, where some of the best fire-clay material in the country is manufactured into brick. The clay seems to be in almost limitless quantity, and of an unusually good quality, as the subjoined analyses goes to show. There are four works situated on the railroad: Cheltenham Fire Brick Co., consuming 10,000 tons of the raw material every year, turning out about 10,000 fire brick a day. Laclede Fire Brick Manufactory, 25,000 brick per day; the Pacific Fire Clay Works, 5000 brick per day; Mitchell's Works, capacity unknown.

Beside fire brick, these companies are largely engaged in the manufacture of furnace tiles of all sizes, and large numbers of retorts for gas works, etc. The Cheltenham Company claims to have the largest works in the country, and their buildings are certainly very capacious. The following is a description of some of the processes employed in the manufacture. At the Laclede Works they have run a drift into a bank, some thousand feet back, with rooms branching off. The vein is some nine feet high, with silicious sandstone at the bottom, with a three inch vein of coal on top. A six month's supply of the clay is heaped up on one side of the opening, and allowed to weather six months, when it is much loosened, and many of the impurities washed out. Then it is mixed with one-third calcined clay, and carried into the second story of a large building, and passed through a shoot on two pairs of rollers by which it is ground very fine. It is there raised by an elevator and thrown into a mixer, which feeds it into a pug mill, from which it is ready for the molds.

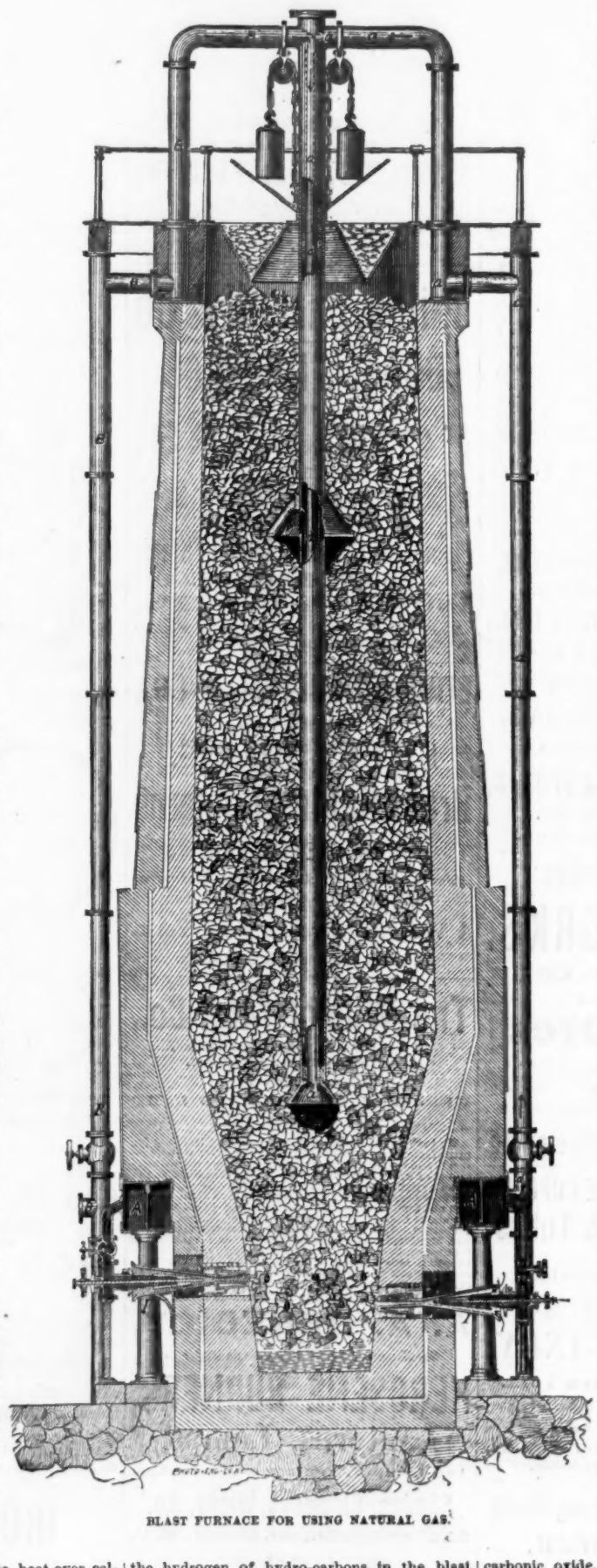
The molded clay is allowed to dry from 10 to 14 days, then placed in kilns, where it is "burned" from 36 to 90 hours, according to the character of the kiln. The "up and down draught kilns" require some 36 hours, with a large saving in fuel; the "down draught kilns" require from 60 to 90 hours. The waste heat from the kilns passes through flues under the floors of the molding-rooms, and thence out through a common stack.

Prof. A. Litton, of Washington University, has made a very complete analyses of the Cheltenham clay, which proves it to be of a superior quality in several respects to the famous English Stourbridge fire clay:

	Cheltenham Clay. Crude Clay.	Washed Clay.	Analysed by Willis. Stourbridge Clay.
Silica	61·02	59·60	67·34
Alumina	26 64	26·41	21·01
Oxide of Iron	1·70	1·61	2·03
Lime	·70	1·00	....
Magnesia	·08	·07	Alkalies. 1·38
Potash	·48	·29	....
Soda	·25	·16	....
Sulphur	·45	·38	....
Water	9·68	10·48	8·24
	10·000	100	100·00

Utilization of Natural Gas in the Manufacture of Pig Iron.

The discovery of almost inexhaustible supplies of natural gas in various sections of the United States has already led to its successful substitution for coal in some of the largest rolling mills at and near Pittsburgh. To ascertain how far it may be substituted for charcoal in the manufacture of pig iron, it was also in an experimental way introduced, together with the blast, into the hearth of a charcoal blast furnace, and it was found that the quality of the iron was much improved. Looking to the chemical constituents of natural gas which, according to Mr. Otto Wuth's analysis is almost wholly a hydrocarbon of the composition of C_4H_2, with but little CO and CO_2,* and therefore contains approximately 80 per cent. of carbon and 20 per cent. of hydrogen, it is evident that, if applied to the blast furnace process in the manner stated, 85 per cent. of the gas is wasted, as under such circumstances its hydrogen, by coming in constant contact with incandescent coke, escapes unburnt with the waste gases, while its carbon is burnt merely to carbonic oxide. To prevent the reconversion of the H_2O and CO_2 generated by the reduction of the ore, no coke or coal must be charged with the ore and flux, and the blast furnace process be conducted exclusively with natural gas for fuel, as experiments have shown that mixtures of carbonic acid, carbonic oxide and hydrogen, as well as hydro-carbon gas or vapor, when passed at a red heat over an excess of iron ore (unmixed with coke) are entirely converted into carbonic acid and water. The most efficient and economical way to apply natural gas in the blast furnace process, will therefore be to effect the reduction and carbonization of the ores in the upper part of the furnace by passing over them at a red heat the hydrocarbon gas, together with the reducing gases generated in the hearth of the furnace, and to smelt the reduced and carbonized metal and slag material by the combustion of the gas introduced at the tuyeres together with the blast. A gas blast furnace working upon this principle is represented in the accompanying illustration, in which *a a'* represents the gas pipe, *b b'* the blast pipe, *j j* the injectors introducing gas and blast into the hearth of the furnace. The gas required for the reduction and carbonization of the iron is introduced by the central (or hydro-carbon) tube *b* descending from the top of the furnace down to the lower level of the reducing zone. To protect the hydro-carbon tube against destructive heat, it is surrounded by another tube *b'* of larger diameter, which is connected with the blast pipe *b*. The compressed air admitted by the latter into the annular space left between it and the hydro-carbon tube *a'* entering at the top, has to circulate around the whole length of the hydro-carbon tube before it is allowed to escape into the interior of the furnace at a certain depth below the surface of the furnace material, and at a certain hight above the point at which the gas enters into the reducing zone. The openings by which the gas and blast enter the latter are protected by umbrella shaped projections to prevent their being choked up, and to facilitate the distribution of the air and gas among the contents of the furnace. By this arrangement the blast introduced into the interior of the upper part of the furnace acts not only as a protection for the hydro-carbon tube, but also effects the combustion of such hydro-carbon gas as may not have been utilized for the reduction, carbonization or melting of the ore and flux. The heat generated thereby, together with the heat carried along by the gases ascending from the hearth, serves to heat the fresh charges of the smelting materials, and to drive off the moisture and greater part of the carbonic acid contained in them, while the free oxygen of the blast, together with the superheated steam generated by the conversion of the hydrogen of the hydro-carbon gas into water, aids the oxidation and volatilization of the greater part of the deleterious substances (such as sulphur, etc.) which may be contained in the ore and flux.



BLAST FURNACE FOR USING NATURAL GAS.

This preliminary heating and roasting to which the latter are subjected before they enter the reducing zone greatly facilitates their reduction, which is now rapidly effected by the united action of the hydrogen and carbonic oxide of the gases ascending from the hearth, together with the hydro-carbon gas which is admitted by the tube *a* into the interior of the reducing zone, as described before.

To determine the relative action of hydrogen and carbonic oxide, Mr. I. Lowthian Bell conducted for 1½ hours a mixture of 12 vol. H to 100 vol. CO over calcined Cleveland ironstone, heated to the temperature of melting zinc. Sixty-eight per cent. of the original O of the ore was removed, and 4·6 parts of deposited carbon obtained per 100 parts of iron present. Pure carbonic oxide, passed at the same temperature over the ore, removed only 5·8 per cent. O in one hour, and 9·4 per cent. of original O in seven hours. With the same mixture of 12 vol. hydrogen to 100 vol. carbonic oxide passed at a white heat over calcined Cleveland ore, the action was so energetic that the gas was all converted into carbonic acid and water for 25 minutes, when this oxygen absorption ceased on account of the fretted condition of the ore. Further experiments showed that the relative reducing action of H and CO was as follows:

	Temperature.		
	Melting Zinc.	Bright Red.	White Heat.
Ratio of H to CO	12·8 to 100 vol. CO	7·4 to 100	26·2 to 100
Weight for weight, the reducing action of H is more energetic than CO	11·9 times	8·6 times	30·5 times

The reducing energy of mixtures of H and CO is therefore increased in almost direct proportion with their increase in H.

In order to ascertain whether the carbon or the hydrogen in hydro-carbon gas exercised the stronger reducing action, well dried coal gas was passed over a quantity of dried calcined Cleveland ore at a temperature *below redness*, and it was found that the reducing action which took place was *almost exclusively due to the hydrogen*. According to the same author, the hydrogen of hydro-carbons in the blast furnace will behave like pure hydrogen; its carbon probably acting pretty much as carbon deposited from carbonic oxide. All experiments made with hydrogen and hydro-carbon gases prove not only the superiority of the energy of hydrogen to reduce an oxide of iron, but also that by passing hydro-carbon gases over an excess of iron ores heated to a bright red heat, they are entirely converted into carbonic acid and water. If the hydrogen, once set free near the tuyeres in a *coke blast furnace*, leaves the furnace for the most part *unchanged*, this is due to the fact that during its ascent amongst the furnace materials, it is constantly meeting not only metallic iron, and this metal in all states of reduction, but also large quantities of carbon in a more or less heated state, which prevents its conversion into water. This reduction can not take place in gas furnaces worked as described, as in these no carbon is present in the upper part of the furnace to reconvert the carbonic acid and water generated by the reduction of the ore into carbonic oxide and hydrogen.

To prevent the oxidation of the reduced and carbonized ore on its way from the reducing zone toward the hearth, by the action of the ascending gases generated by the combustion of the hydro-carbon gas introduced with the blast at the tuyeres for the smelting of the reduced metal and slag material, the combustion of the hydro-carbon gas has to be conducted in such a way that the gases resulting therefrom, on their passage toward the upper part of the furnace, maintain a position of equilibrium among the mutual action of iron, carbon, carbonic oxide, nascent carbonic acid and hydrogen. This position of equilibrium amongst tendencies toward oxidizing and deoxidizing, carbon deposition and carbon gasifying, is subject to changes in temperature and of molecular condition of the substances employed, and with their relative amounts of carbonic oxide, carbonic acid and hydrogen. Experiments made by Mr. I. L. Bell with mixtures of carbonic oxide and carbonic acid, showed that the static equilibrium of carbonic oxide and carbonic acid in their action on metallic iron was reached at low red heat with 150 vol. of CO_2 for each 100 vol. CO; at full red heat with 47 vol. of CO_2 for each 100 vol. CO; at approaching white heat with 11 vol. of CO_2 for each 100 vol. CO.

The influence of the molecular condition of the materials used in the blast furnace is shown by comparing the analyses of the gases taken from the 48 foot Clarence furnace charged with calcined Cleveland ironstone and coke, with the gases taken from the Wrebna furnace charged with Eisenerz ore and charcoal, which were found by Messrs. I. L. Bell and Prof. Tunner to be composed as follows:

COMPOSITION OF THE GASES.

Of the 48 foot Clarence Coke Furnace.

Depth from Top.	Vol. CO_2 to 100 vol. CO.
4 feet 3"	22·75
9 " 9"	7·25
15 " 7"	2·00
21 " 5"	3·50
27 " 3"	5·50

Of the 35 foot Wrebna Charcoal Furnace.

Depth from Top.	Vol. CO_2 to 100 vol. CO.
Escaping gases	58·8
2d trial	56·2
18 feet 0"	48·0
25 " 6"	51·7
28 " 0"	44·7
32 " 0"	35·6
34 " 6"	7·6

The comparison between these two analyses shows an excessive amount of carbonic acid in relation to the carbonic oxide in the Wrebna furnace, when compared with the gases emitted in smelting Cleveland ore. This difference, according to Mr. I. L. Bell's experiments, is due to the Eisenerz ore losing its O much more readily than the Cleveland ore, and to a much greater extent in an atmosphere richer in carbonic acid, and because the gases have their reducing power constantly reinforced by the ready manner in which the charcoal absorbs oxygen from the carbonic acid, producing fresh supplies of carbonic oxide, which is ready to perform the office of deoxidation on fresh quantities of ore. The much more energetic reducing action of hydrogen and hydrocarbon gas must be attributed to the facility with which the hydrogen decomposes carbonic acid and thereby liberates nascent carbonic oxide, which is probably more energetic in its reducing action than the same gas applied in the ordinary way; and as hydrogen undoubtedly can replace a certain quantity of carbonic oxide in restraining the oxidizing influence of carbonic acid, it may be assumed that the gases generated by the combustion of hydro-carbon in the hearth of the furnace may contain (like those of the Wrebna furnace) a large amount of carbonic acid without losing their static equilibrium, the oxidizing action of the carbonic acid being restrained by the reducing action of the hydrogen and carbonic oxide. This consideration is important, as the more of the carbon contained in the hydro-carbon gas burned at the tuyeres can be converted into carbonic acid without oxidizing iron, the more intense is the heat in the hearth and the smaller the amount of gas required for the smelting of the reduced metal and of the slag material.

By effecting the reduction and carbonization of the iron in the upper part of the furnace by the direct action of the hydro-carbon gas into the reducing zone by tube (*a'*), as described before, we have it in our power by the relative proportion of blast and gas used to regulate the combustion of the hydro-carbon gas at the tuyeres in such a manner that the gases resulting thereby may have either a neutral, an oxidizing or reducing action upon the reduced and carbonized metal, along with its slag material, on its way from the reducing zone toward the hearth, according to the "richness" or quality of the metal to be produced.

To prevent, as far as possible, any loss of metal which may result by the oxidizing action of the blast upon the melting metal at the tuyeres, it is advisable, especially when "rich" metal shall be produced, to introduce part of the hydro-carbon gas at a level somewhat below the level at which the blast enters (as shown in the annexed cut), as by this means any iron oxide formed at the tuyeres will be reduced again by the reducing action of the hydro-carbon gas admitted by the lower tuyeres. The advantages derived by the substitution of natural gas for coke or charcoal in the manufacture of pig iron by the blast furnace process may be summed up as follows:

1st. Great economy; as where natural gas can be obtained in sufficient quantity by boring for it to a moderate depth, it is not only the purest, cheapest, most convenient and, in its application, labor saving, but also the most energetic and efficient reducing agent and fuel known, as, if applied as described above, all its carbon is converted into carbonic acid, its hydrogen into water. While coke or coal, burned with hot blast to the state of oxidation, it is found in the waste gases (viz. 40 to 45 vol. CO_2 to 100 vol. CO), gives out but 3700 caloric units, natural gas burned to CO_2 and H_2O produces 12,236 units; the latter is, therefore, weight for weight, $\frac{12,236}{3700} = 3·3$ times more effective in the blast furnace process than coke.

2d. Large increase in the daily output of metal, as the capacity of the gas furnace for ore is more than doubled by no coke being charged with the ore and flux. Beside this the charges are much more rapidly reduced and smelted down by the more intense heat generated by the combustion of the hydro-carbon and their much greater reducing energy.

3d. Great saving in first cost of plant on account of the smaller capacity of furnace required per ton of iron turned out per day. No money required for keeping large stock of coal or coke on hand; no investment to be made for coking ovens. Where natural gas of high pressure is obtained, injectors worked by the expansive force of the gas itself can be substituted for expensive blast engines to supply the blast required for the furnace.

4th. By introducing the hydro-carbon gas separately to the various zones of the furnace, the working of the blast furnace is greatly facilitated and easier controlled, and iron of almost any desired degree of carbonization may be obtained at will.

5th. A superior quality of iron is produced, as most of the impurities in the ore and flux are eliminated by the preliminary roasting to which the charges are subjected before they enter the reducing zone, where their reduction and carbonization is effected at such a low temperature that only the iron is reduced, but none of the impurities requiring a much higher temperature for their reduction. After reduction and carbonization the reduced metal, on its way from the reducing zone toward the hearth, is subjected to the refining action of the ascending gases, more or less rich in carbonic acid, which latter, as shown by Mr. John F. Bennett and proved by the action of the puddling furnace gases, acts as a powerful oxidizing agent upon the removal of sulphur, silicon and phosphorus with which the iron may be contaminated.

In the gas furnace even ores rich in phosphorus may be worked by moistening them before they are charged into the blast furnace with a concentrated solution of chloride of magnesia (the refuse liquor of salt works) or of chloride of manganese (the refuse of alkali works), which both, heated to redness, are decomposed, their chlorine combining with the phosphorus to perchloride of phosphorus, which is highly volatile and escapes with the waste gases of the furnace.

The same observations made in regard to natural gas are applicable to petroleum. To ascertain the minimum of coke, gas or petroleum required to produce 1 ton of pig iron, we must take as the basis of calculation an assumed condition of the fuel, of the atmosphere and of the iron ore and flux.

For our calculation the following data, given

(Continued on page 5.)

* Later and more complete analyses show that its composition is mainly marsh gas, $C H_4$.—[*Ed. Iron Age.*

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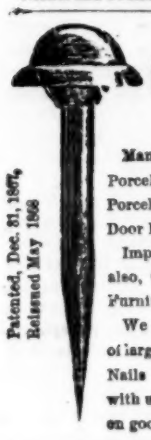

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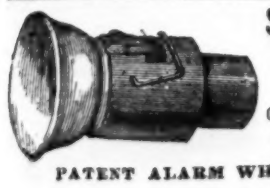

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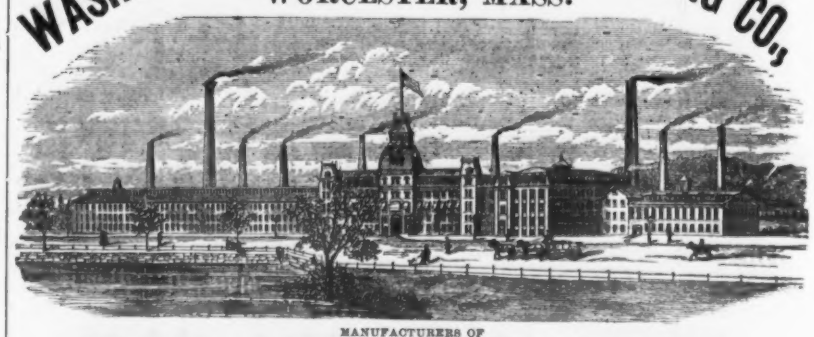

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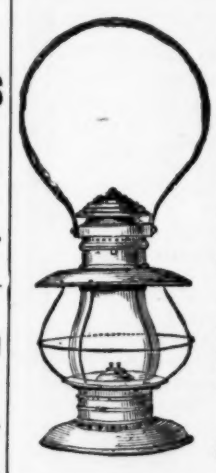

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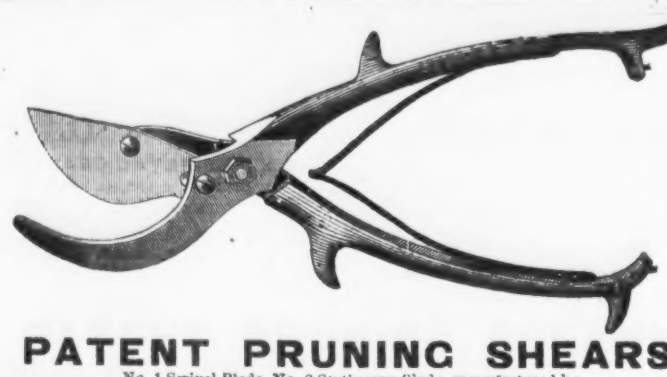

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We herewith illustrate the only really good TIN TEA KETTLE now made. We furnish only the Trimmings for them; and show cuts of the Handle and Spout. The former article is much stronger than any handle which has ever been introduced. It *fits the hand* splendidly, and being *hollow*, NEVER HEATS. The ear is strong and has a wide base. Altogether it is a fine thing, and sells at sight.

Price Plain, 75 cts. per doz.; Re-tinned, $1 00.

The spout, it will be noticed, is stamped from one piece of I x Tin, and side flanges folded ready to lock into the body of the kettle; it is then double seamed to the bottom, as the rest of the body is. It never leaks, as do all other spouts, and cannot clog with lime. We have sold immense quantities of them, and the sale grows constantly.

Re-tinned, per doz.—5 in., (No. 50,) 67 cts.; 6 in., (No. 60,) 75 cts. 6¾ in., (No. 70,) 80 cts.
All are 2¾ in. wide.

☞ If you make all of your Tea Kettles with the CHICAGO TRIMMINGS, you will materially increase your trade.

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Bird Cages.

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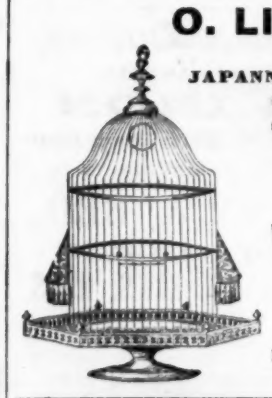

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PLANE IRONS.

Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

Heating Buildings by Hot Water.

Up to a very recent period a considerable amount of hostile prejudice existed in regard to the use of hot water apparatus, and even now the plan of heating buildings by such agencies is not fully appreciated. Imagining that antipathy to the system arises in many cases from a lack of acquaintance with its peculiar merits, we shall endeavor to explain the principles which govern the action of hot water apparatus generally, and furnish some information as to their best form and proportions. In order to do this effectually, we must first glance at one or two of the natural laws which affect the circulation of fluids and gases. That all falling bodies gravitate with the same velocity, and therefore descend through a certain definite space in a given time, is an effect of which gravity is the cause. It is from this cause that we obtain the unerring action of the pendulum. To the same source may be distinctly traced the phenomena attending the circulation of hot water through pipes, and this circulation, once created, forces all the water in the apparatus to pass successively through the boiler by which it is primarily heated. It is upon the continuous and uniform movement of the water along the pipes that the efficiency of the hot water apparatus immediately depends. Let us, then, inquire as to the power which insures this vitality, for without a clear perception of its nature there will ever be uncertainty as to the working of any apparatus of the kind in question. The force which produces circulation arises from the fact that the water in the descending pipe is heavier than that which is in the boiler, or, to put it differently, when heat is applied to the boiler, a dilatation of the water within it ensues. The heated particles ascend through the colder ones, while the latter descend, by reason of their greater specific gravity, and in turn become also heated. Expansion follows, and this species of action and reaction proceeds until all the particles are equally heated. It follows that the colder the water is in the descending pipe, relatively with that in the boiler, the more rapid will be its motion through the circulating pipes, and hence the diffusion of heat through their pores and into the atmosphere surrounding them.

Thus much of the general principles which control the action of hot water apparatus as applied to the heating of buildings, and now as to their particular dimensions and details. These will naturally have to be varied with the character and size of the buildings to be heated. For churches and large structures of a similar kind, and which have an ordinary number of doors and windows, it will be necessary, in devising hot water apparatus, to ascertain, first, the cubic contents of the auditorium. Having obtained this knowledge, let the number gained be divided by 200. The quotient will yield the length in feet of 4 in. pipe required to maintain something like a steady temperature of 55°. For smaller apartments, as, for example, dwelling houses, etc., the cubic measurement, divided by 150, will furnish the proper length of 4 in. pipe. These simple rules, which are the result of extensive practice and careful observation, may be safely relied upon, unless under very exceptional circumstances, and which, of course, would have to be duly considered by the constructor of an apparatus intended to meet them.

In reference to green-houses, conservatories, and buildings of a like character, where the temperature should reach a mean of 60°, the sum of the cubic contents divided by 30 will give the length in 4 in. pipe required to produce the desired effect. Forcing houses, again, must have special calculations made for properly heating them. Nothing short of a uniform temperature of 70° to 75° will suffice for such places. In order to insure this the measurement, as before suggested, must be divided by 20, the quotient being the length of circulating pipe required. For gaining yet higher temperatures, lower divisors will have to be employed, and if smaller pipes be determined upon, the length must be proportionately increased. These are points of detail, however, which may be safely left to the skilled manufacturer who may be intrusted with the making of hot water apparatus for special purposes. Our own data may be taken as the base of calculations for economically and effectually heating buildings by means of hot water.

We are aware that some horticulturists have adopted the plan of heating their forcing houses to a much higher temperature than that indicated above, and of allowing a greater amount of ventilation than is usual. By aid of such arrangements, it is said, a finer fruitage is obtained, but there is no doubt that this course involves increased expense in the first cost of the heating apparatus, together with a large augmentation in the subsequent daily consumption of fuel for working it.

An important consideration to the horticulturist and floriculturist is the waste of heat through glass roofs and walls. It has been found, from a course of carefully made experiments, that one square foot of glass will cool 1·279 cubic feet of air as many degrees per minute as the internal temperature of the house exceeds the external temperature. Thus, if the difference between the internal and the external temperature be 30°, 1·279 cubic feet of air will be cooled 30° by each square foot of glass in the building which is exposed also to the outer atmosphere. It will be admitted that this fact should be allowed its due weight in contriving hot water apparatuses for houses wholly or partly constructed of glass. Of course, in estimating the area of glass, due deductions must be made for the sash frames and wood work by which the panes are surrounded. If the frames and sashes be made of metal, the radiation and consequent loss of heat through them will be equal in extent to that which results from the glass itself.

The quantity of air to be heated per minute, so far as conservatories and forcing houses are concerned, should not be less than 1¼ cubic feet for each square foot of glass which the building contains. When the quantity of heated air required has been thus ascertained, the length of pipe may be determined by the following formula, viz.: Multiply 125 by the difference between the temperature at which the house is proposed to be kept (when at its maximum) and the temperature of the external air, and divide the product by the difference between the temperature of the pipes (200°) and the proposed temperature of the room. Then the quotient multiplied by the number of cubic feet of air to be heated per minute, and its product divided by 222 will give the number of feet of 4 in. pipe to yield the desired effect.

A word or two may be said as to the quality of the water to be used for heating purposes. Sometimes foul water is employed, under the impression that anything will do for the hot water apparatus. This is a grievous error, for the result will be the deposit of a coating of mud or other material throughout the pipes, thus impairing their radiating action and efficiency. The boiler, too, will suffer if it be not eventually destroyed by such a neglect of ordinary precautions. When saline matter occurs in a boiler, obviously damage to it and waste of fuel must be the consequence. The sediment can only be removed with difficulty. A weak solution of muriatic acid will assist in effecting its dispersion. Rain water is better adapted for use in heating apparatuses than water of any other kind, and when obtainable, therefore, it should always be employed. When an apparatus is disused for a time and left with water standing in the pipes, there is danger of the latter freezing. Possibly the pipes may burst under such circumstances. It is a wise precaution, therefore, to leave the pipes either entirely or partially empty, when the apparatus is not likely to be put into action for any length of time. With ordinary care the hot water apparatus may be made to last—if originally well constructed—for very many years. It is really an economical application of science to the practical wants of daily life, and we predicate for it a widely extended field of usefulness when its advantages are more completely understood.

Pressing of Cotton in St. Louis.

Within the last two years an important and growing interest in cotton has sprung up in St. Louis. Every day car loads of cotton bales pass along over the Iron Mountain and Southern Railroad, whilst the admiring citizens of St. Louis count the cars with satisfaction and interest, prophesying great things for the future of their city. There are three or more compress companies there, but, as is generally the case, the largest one has almost a monopoly. The "St. Louis Cotton Compress Co." is this big fish in this pond, and also claims to be the largest in the United States. It is situated on the bank of the river, with the main line of the Iron Mountain and Southern Railroad running close to its platforms. The buildings are of brick and have two floors for storage. The buildings themselves are of the following dimensions: No. 1, 183 feet by 300 feet; No. 2, 140 feet by 300 feet; No. 3, 217 feet by 300 feet. This gives a storage capacity of 50,000 bales under cover, or a space equivalent to 11 acres, not including the platform room, which is very considerable.

The presses used are of John F. Taylor's patent, of 500 tons power, called the "Steam Hydraulic Cotton Press." The peculiarity consists in the action of steam-power directly upon the water without the use of a pump. The press is included within two heavy cast iron standards, with two rams, which raise the lower jaw or platform until the bale placed on it has been reduced to at least one-third of the original size, and become as hard as wood. It is held in place under the pressure until banded with iron hoops, and is then ready for shipping. In this manner the company can press 50 bales an hour, and load five tons in a car. The company have struck a gas well, which they propose using for fuel. The last year's cotton crop in the "Northern Belt" has been unusually good, which "belt" is naturally tributary to St. Louis, but a great deal of the cotton is brought from Texas, and those States that belong more to New Orleans and Galveston.

The trade is so new and of almost abnormal growth that its future will be watched with interest and some anxiety, though it has been met with so much enterprise and energy that those engaged in it certainly deserve success.

Boltzman, by experiment, has been adding confirmation to the theory that considers light and electricity modes of motion of one and the same medium, by showing that from it there should result a certain relation between the refractive power of a substance and its dielectric properties, a relation confirmed by observation. A further confirmation of the same theory has also been lately published by Boltzmann, based on investigations into the behavior of non conducting bodies under the influence of electric forces. He says that, according to Maxwell's theory, the constant of di-electricity for non-isotropic crystallized bodies must depend upon the direction in which the electric forces act upon it, varying in a manner such as can be predicated from the optical properties of the body. The only double refracting crystals that are appropriate to the investigation are those of sulphur. Two spheres cut from crystals of sulphur, whose optical axes had been previously determined, were experimented with by allowing the electricity to act in various directions in reference to the optical axes. In this manner the magnetic axes, as they may be called, were determined, and were shown to agree with the optical axes; and the same results being arrived at from both spheres, he concludes that these observations not only confirm Maxwell's theory as to the nature of electricity, but also definitively decide that the vibrations of ether forming light are perpendicular to the plane of polarization.

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SHEET AND PLATE IRON,
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PIG IRON, OLD RAILS.
Wrought Iron Beams. Iron of all sizes and shapes made to order.

Manchester Steel Works,
ENGLAND,
sell from stock, at lowest prices, all descriptions
Best Tool & Machinery Cast Steels
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JOHN A. GRISWOLD & CO'S
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MACHINERY STEEL,
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Special Irons for Bridge and Architectural Work.

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Iron Merchants,
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A full assortment of all sizes constantly on hand.
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IRON AND STEEL OF ALL KINDS
Constantly on hand. Horse Shoe Iron and Nails, Norway Iron, Cast Spring, Toe Calk, and Bessemer Steel Tire.
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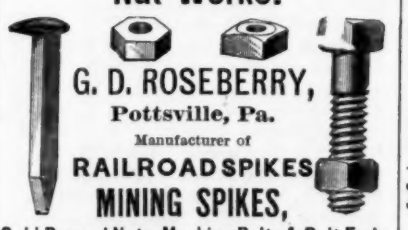
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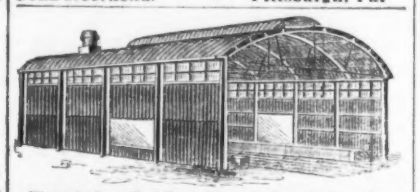

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PATENT

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BEST DOUBLE-REFINED MERCHANT BAR IRON,

CAR AXLES AND STRAP RAIL.

ORDERS CAN BE FILLED AT ONCE.

Utilization of Natural Gas in the Manufacture of Pig Iron.

(Continued from page 1.)

by Mr. I. L. Bell, will be adopted as forming the groundwork of the estimate:

Durham coke, 100 parts consisting of:

Ash and S	5 per cent.
Water	2½ "
Carbon	92·5 "

One ton of iron will require: Limestone, 11 cwt., composed of 6·16 CaO, 4·84 CO_2; ironstone of Cleveland, calcined, 49 cwt., composed of 18·6 Fe, 9 O, 21·4 earths, sulphur, phosphorus, etc. The slag will weigh:

	Cwt.
Ash from Coke	1·10
CaO from CaO, CO_2	6·16
Earth from ironstone	21·4
Less bases taken up by iron, fumes, etc.	2·74
	20·66
Total slag	27·92

Applying these coefficients of absorption we have:

TABLE OF COMPARATIVE HEAT ABSORPTION FOR THE PRODUCTION OF ONE TON OF IRON BY COKE, NATURAL GAS AND PETROLEUM AS FUEL.

COKE FUEL.	Units.
CLASS I.—Chemical action and fusion:	
No. 1. Evaporation of H_2O in coke = 0·58 cwt. × 540	312
No. 2. Reduction of Fe_2O_3 = 18·60 × 1780	33,108
No. 3. Carbon impregnation 0·60 × 2400	1,440
No. 4. Expulsion of CO_2 from CaO, CO_2 = 11 × 370	4,070
No. 5. Decomposition of CO_2 in CaO, CO^2 = 1·32 × 3200	4,224
No. 6. Decomposition of H_2O in Blast, H = 0·05 × 34,000	1,700
No. 7. P_2O_5, SO_3 and SiO_2 reduced	3,500
No. 8. Fusion of pig iron, 20 × 330	6,600
No. 9. Fusion of slag, 27·92 × 550	15,356
Total	70,310
CLASS II.—Unavoidable loss:	
No. 10. Transmission through walls	3,600
No. 11. Carried off by tuyere water	1,800
No. 12. Expansion of blast, etc.	3,700—9,100
Total heated absorption	79,410
requiring 79,410 / 3700 = 21·3 cwt. coke.	
beside carbon impregnation of iron 0·7 cwt. coke.	
Total coke	22 cwt.

NATURAL GAS.	Units.
No. 1. None	0
No. 2. Same	33,108
No. 3. Same	1,440
No. 4. Same	1,440
No. 5. None, as CO is burned again to CO^2	4,070
No. 6. Less than half of blast required	850
No. 7. As less P and S go into the iron	0
No. 8. Same	2,500
No. 9. 26·82 × 550	6,000
No. 10. Smaller furnace	14,751
No. 11. Same	1,440
No. 12. Only half blast required	4,070
Total heat absorption in gas furnaces	69,569
requiring 69,569 / 12,356 = 5·6 cwt gas,	
beside carbon impregnation	0·6 cwt gas.
Total	6·2 cwt. gas.

Allowing 7 × 100 = 700 units for evaporating petroleum, it will take for one ton of iron = $\frac{69,569 + 700}{10,810}$ + 0·6 = 7·1 cwt. petroleum = 2⅓ bbls.

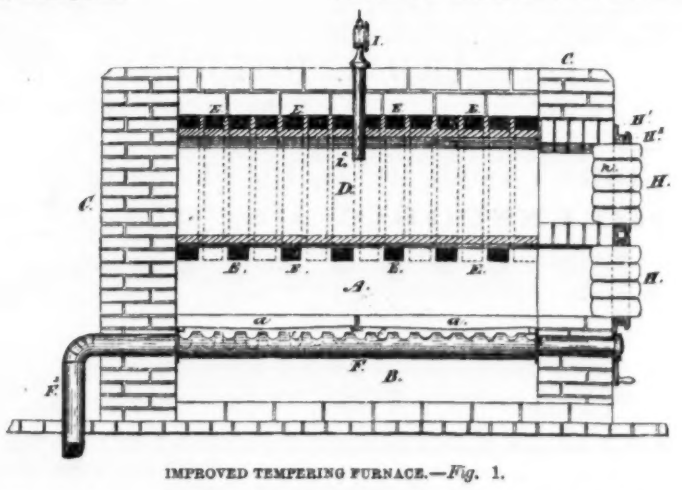
New Patents.

We take from the records of the Patent Office at Washington the following specifications of certain patents, lately issued, which will be found interesting:

IMPROVEMENT IN FURNACES FOR HEATING STEEL IN TEMPERING.

Specification forming part of Letters Patent No. 170,430, dated November 30, 1875, issued to John B. Armstrong, of Guelph, Canada.

This invention relates to the heating of articles manufactured from steel, or from steel and iron, in tempering.



IMPROVED TEMPERING FURNACE.—*Fig.* 1.

It consists of a close oven or retort, to which a pyrometer is attached, heated from a blast furnace placed below the retort, or in any other convenient position, the heat from the furnace being forced to circulate freely around the retort in flues which receive and discharge on alternate sides, the blast and discharge being regulated by peculiarly constructed dampers.

The object of the invention is to uniformly raise the temperature of the contents of the retort to any required degree of heat, and to hold the temperature stationary at such degree until the whole mass of the contents has thoroughly and uniformly acquired the desired degree of heat. It has a double application in the art of heating steel for tempering; first, heating the steel uniformly to a stated degree before hardening in oil or any of the usual liquids; second, drawing or "letting down" the temper of steel after hardening, in the usual way, to a uniform degree.

In the accompanying drawings, Figure 1 is a longitudinal section, and Fig. 2 is a cross section of a tempering furnace constructed according to this invention.

A is a furnace, constructed in the usual way, of brick or other suitable material, having an ash pit, B, underneath. *a* are the usual grate bars, resting on the side walls C. Immediately over the furnace the close retort D is placed, the bottom of the retort forming the roof of the furnace. The walls, roof and floor of the retort are constructed of fire-clay, fire-brick, or other suitable material, when the retort is used for heating the steel to harden; but when the furnace is to be used only for drawing the temper after hardening, a cast or wrought iron retort may be used, as a less degree of heat is required than in the former process.

E are flues, which take the flame, heated gases, etc., from the upper part of the furnace up one side, over the top, and down the other side of the retort, the heated gases, smoke, etc., escaping through suitable passages to a common vent. These flues E are narrow passages formed along the whole length of the retort, the intervening walls being thin partitions of fire clay or cast iron.

The flues are so arranged that they take the draft from and deliver it at alternate sides of the furnace, thus equalizing the distribution of the heat over the whole surface of the retort.

F is the blast pipe, placed beneath and extending under the whole length of the furnace. The blast pipe F is cylindrical in shape, the upper surface being perforated with holes *f*, of any convenient diameter, placed at a regular distance apart throughout the entire length under the furnace. Fitting within the pipe F^1 is an inner revolving tube or damper, perforated with holes at the same distance apart longitudinally as those in the outer tube, the only difference being that the holes are elongated in a transverse direction, and are cut to form a spiral on the tube.

The object in thus cutting the holes in the inner tube or damper is to enable the operator to vary the position of the delivery of the blast, in order to equalize the heat in the furnace and retort. Thus he may give an equal distribution of the blast throughout the entire length of the furnace, or he may cut it off partially or entirely at one end, throwing the whole blast into the other end, or vice versa.

G G are cut off dampers, arranged to close the exit end of the flues E, regulating the discharge of the heated gases, &c., from the furnace. H H are the doors of furnace and retort, hinged to and fitting on the frames H^1, as shown.

The frames H^1 are bolted or fastened to the brick work in any convenient way, the opening in the frames for the doors being larger than the holes left in the brick work. Thus a rim of brick work appears around the entire inner edge of the frames.

The doors consist of an open frame, of iron, H^2, filled in with fire bricks *h*, the bricks fitting in the door or frame is exposed to the action of the heat. As the fire bricks are burned away they are pushed forward again and again until consumed, when new bricks are inserted, as before.

I is a pyrometer, of the usual construction, fitted to the top of the retort in such a way that the expanding bar extends downward into the interior of the retort within an open guard tube *i*.

For the purposes of example, we will suppose that the retort is charged with single plate cast steel carriage springs. These springs are thick in the center, tapering away to each end. The furnace never cools during the night, the walls being constructed thick enough to retain the heat. The operator knows the degree of heat to which the steel requires to be raised in order to give it the desired temper. He watches the face of the pyrometer, and, by manipulating the blast and blast discharge, he is enabled to bring the whole of the contents up to without exceeding the proper degree of heat. Of course, the thinner portion of the plates reaches that degree first; but they can go no higher than the degree indicated on the pyrometer, waiting, as it were, until the thicker portion has been thoroughly permeated and the whole mass is in one uniform heat, when the springs are taken out and dipped.

In lowering or letting down the temper after hardening, the same operation is repeated, the operator knowing the particular degrees of heat which correspond to different tempers and working accordingly.

In letting down temper the degree of heat is not required to be so high as in the former case, and the retort, if used specially for this purpose, may be constructed of cast iron.

Furnaces for tempering very long saws, &c., may be fitted with two pyrometers, but in ordinary cases the heat can be perfectly regulated by the spirally arranged dampers with one.

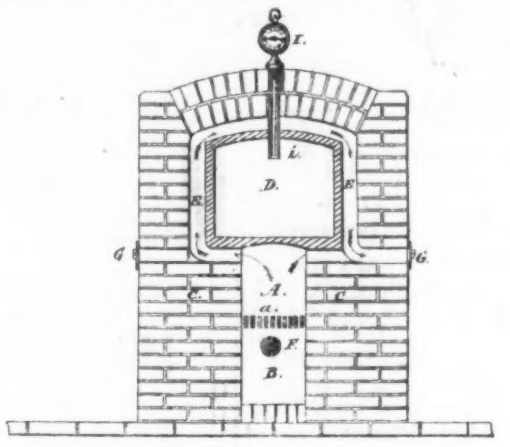


Fig. 2.

The advantages gained by this invention are, first, that steel of regular and irregular shapes and thicknesses can be raised to (without any portion being allowed to exceed) a uniform degree of heat in tempering; second, that the blast to the furnace can be applied equally or unequally during its whole length to suit circumstances; third, that by the application of the pyrometer the operator is enabled to gauge the heat in the retort, raising or lowering the temperature of the furnace accordingly, and, knowing the degrees of heat which give to steel certain tempers, he is enabled to turn out every charge to a known and exact temper.

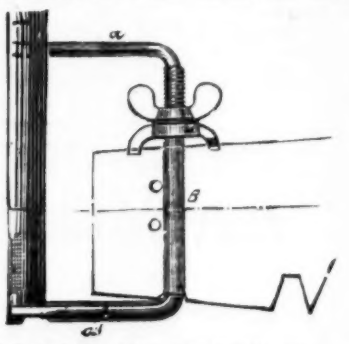
Claim.—1. The blast pipe F, consisting of the inner pipe F^1, perforated with the spirally arranged holes *f'*, in combination with the outer pipe perforated with the holes *f*.

2. The doors H, consisting of the frames H^1, constructed to leave a margin of brick work between the inner edge of the furnace and retort openings, and the rim door H^2, fitted in with fire brick *h*.

We take the following abstract of new patents, issued Dec. 14, from the official record:

CROSS CUT SAW HANDLE.

To Wm. Millspaugh, Middletown, N. Y.—In combination with a saw handle, the slotted



ball B, said ball being constructed with portions *a* and *a'*, connecting with the handle, and with suitable fastening device whereby an open space is left between the end of the saw and handle.

MANUFACTURE OF HEXAGONAL NUTS.

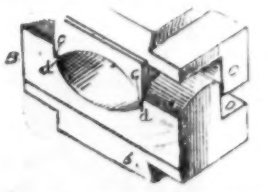
To Geo. Johnson, Haverstraw, N. Y.—1. The method herein described of manufacturing

hexagon nuts by forcing or shaping the bar by dies or rolls to form alternating semi-hexagonal projections and recesses, and admit the cutting off of the nuts at one cutting-plane only.

2. A blank or bar for making hexagon nuts, made with alternating semi-hexagonal projections and recesses at both sides.

MANUFACTURE OF PICKS.

To J. C. Klein, Pittsburgh, Pa.—The lips are for preventing the formation of fins, and the



projection and recess for working the prongs or arms of the pick.

The dies B, provided with dovetails *a*, cheeks *c d*, projection C and recess D.

Iron.

CLEVELAND.

CLEVELAND ROLLING MILL CO.,

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For each additional constituent of usual occurrence	1 50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
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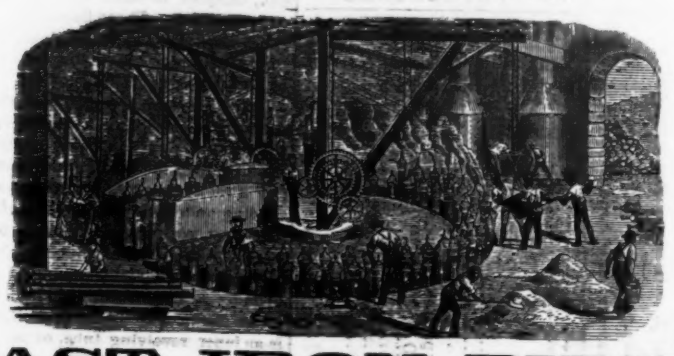

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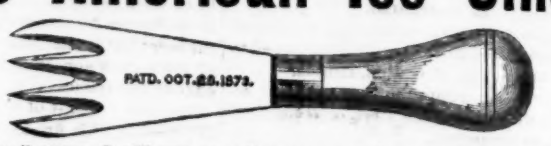

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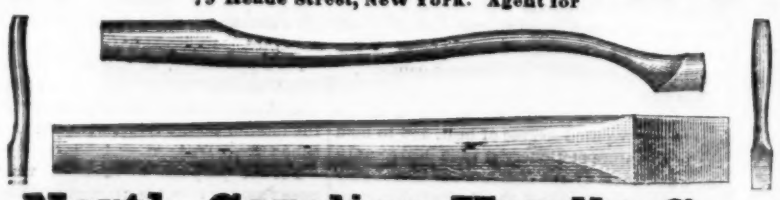

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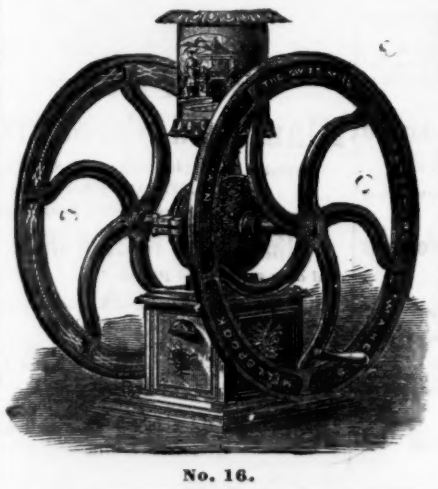

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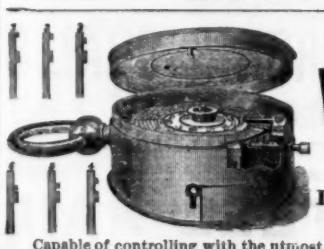

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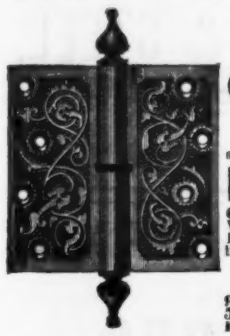

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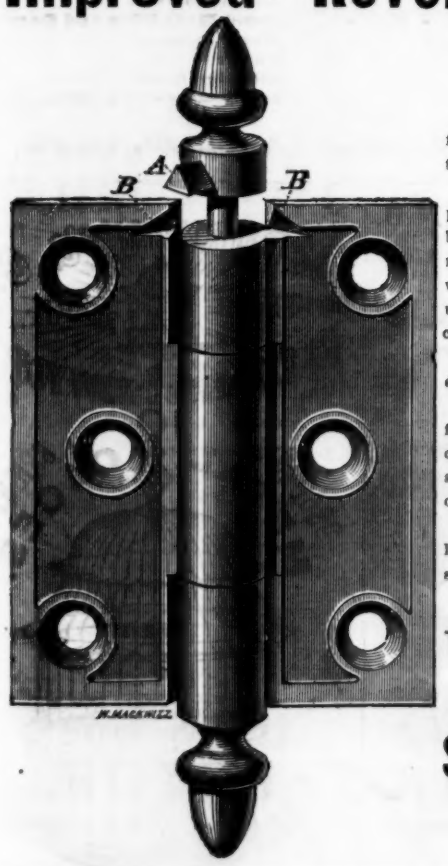

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The Influence of Gas and Water Pipes in Determining the Direction of a Discharge of Lightning.

Although the invention of the lightning conductor is one of the noblest applications of science to the wants of man, and its utility has been established in all parts of the world by the experience of more than a century, yet a sufficient number of instances are recorded of damage done by lightning to buildings armed with conductors to produce, in the minds of some, an impression that the protective influence of lightning conductors is of but questionable value.

The destruction by fire of the beautiful church at Crumpsall during a thunder storm on the morning of the 4th of January last, has induced me to bring before the society, with a view to their being known as widely as possible, some facts connected with the electric discharge which have guided me for some years in the recommendation of means by which disasters of this kind may be averted.

For the proper consideration of this subject it is necessary to make a distinction between the mechanical damage, which is the direct effect of the lightning stroke, and the damage caused indirectly by the firing of inflammable materials which happen to be in the line of discharge.

Instances of mechanical injury to buildings not provided with conductors are still sufficiently numerous to illustrate the terrific force of the lightning stroke, and at the same time the ignorance and indifference which prevail in some quarters with respect to the means of averting such disasters; for wherever lofty buildings are furnished with conductors from the summit to the base, and thence into the earth, damage of the mechanical kind is now happily unknown.

Even in those cases where lightning conductors have not extended continuously through the whole hight of a building, or where the lower extremity of the conductor has, from any cause, terminated abruptly at the base of the building, the severity of the stroke has been greatly mitigated, the damage being limited, in many cases, to the loosening of a few stones or bricks.

The ever-extending introduction of gas and water pipes into the interior of buildings armed with lightning conductors has, however, greatly altered the character of the protection which they formerly afforded, and the conviction has been long forced upon me, that, while buildings so armed are effectually protected from injury of the mechanical kind, they are more subject to damage by fire.

The proximity of lightning conductors to gas and water mains, as an element of danger, has not yet, so far as I know, engaged the attention of electricians, and it was first brought under my notice at Oldham, in 1861, by witnessing the effects of a lightning discharge from the end of a length of iron wire rope, which had been fixed near to the top of a tall factory chimney, for the purpose of supporting a long length of telegraph wire. The chimney was provided with a copper lightning conductor terminating in the ground in the usual manner. In close proximity to the conductor, and parallel with it, the wire rope descended, from near the top of the chimney, for a distance of 100 ft., and was finally secured to an iron bolt inserted in the chimney about 10 ft. from the ground. During a thunder-storm which occurred soon after the telegraph wire was fixed, the lightning descended the wire rope, and, instead of discharging itself upon the neighboring lightning conductor, darted through the air for a distance of 16 ft., to a gas meter in the cellar of an adjoining cotton warehouse, where it fused the lead pipe connections and ignited the gas. That the discharge had really passed between the end of the wire rope and the lead pipe connections, was abundantly evident from the marks made on the chimney by the fusion and volatilization of the end of the wire rope, and by the fusion of the lead pipe. As the accident occurred in the day time, the fire was soon detected, and promptly extinguished.

Another and equally instructive instance of the inductive influence of gas pipes in determining the direction of the lightning discharge occurred in the summer of 1863, at St. Paul's Church, Kersal Moor, during divine service. To the outside of the spire and tower of this church a copper lightning conductor was fixed, the lower extremity of which was extended under the soil for a distance of about 20 ft. The lightning descended this conductor, but, instead of passing into the earth by the path provided for it, struck through the side of the tower to a small gas pipe fixed to the inner wall. The point at which the lightning left the conductor was about 5 ft. above the level of the ground, and the thickness of the wall pierced was about 4 ft.; but beyond the fracture of one of the outer stones of the wall, and the shattering of the plaster near the gas pipe, the building sustained no injury.

That the direction of the electric discharge had, in this case, been determined by the gas pipes which passed under the floor of the church, was evident from the fact that the watches of several members of the congregation who were seated in the vicinity of the gas mains were so strongly magnetized as to be rendered unserviceable.

The church at Crumpsall is about a mile distant from that at Kersal Moor, and the ignition of the gas by lightning, which undoubtedly caused its destruction, is not so distinctly traceable as it is in other cases which have come under my observation, because the evidences of the passage of the electric discharge have been obliterated by the fire. From information, however, communicated to me by the clerk in charge of the building as to the arrangement of the gas pipes, the most probable course of the electric discharge was ultimately found.

The church is provided with a copper lightning conductor, which descends outside the spire and tower as far as the level of the roof. The conductor then enters a large iron downspout, and from thence is carried into the same drain as that in which the spout discharges itself. Immediately under the roof of the nave and against the wall, an iron line of gas pipe extended parallel with the horizontal lead gutter which conveyed the water from the roof to the iron spout in which the conductor was enclosed. This line of gas piping, though not in use for some time previous to the fire, was in contact with the pipes connected with the meter in the vestry, where the fire originated, and was not more than 3 ft. distant from the lead gutter on the roof. As no indications of the electric discharge having taken place through the masonry were found, as in the case of the church at Kersal Moor, it seems highly probable that the lightning left the conductor at the point where the latter entered the iron spout, and by traversing the space between the leaden gutter and the line of gas piping in the roof, found a more easy path to the earth by the gas mains than was provided for it in the drain.

In my experiments on the electrical condition of the terrestrial globe I have already directed attention to the powerful influence which lines of metal extended in contact with moist ground exercise in promoting the discharge of electric currents of comparatively low tension into the earth's substance, and also that the amount of the discharge from an electro-motor into the earth increases conjointly with tension of the current and the length of the conductor extended in contact with the earth. It is not, therefore, surprising that atmospheric electricity, of a tension sufficient to strike through a stratum of air several hundred yards thick, should find an easier path to the earth by leaping from a lightning conductor through a few feet of air or stone to a great system of gas or water mains, extending in large towns for miles, than by the short line of metal extended in the ground which forms the usual termination of a lightning conductor.

It deserves to be noticed that in the cases of lightning discharge which I have cited, the lightning conductors acted efficiently in protecting the buildings from damage of a mechanical nature—the trifling injury to the church tower at Kersal Moor being directly attributable to the presence of the gas pipe in proximity to the conductor. Nor would there have been any danger from fire by the ignition of the gas if all the pipes used in the interior of the buildings had been made of iron or brass instead of lead; for all the cases of the ignition of gas by lightning which have come under my observation have been brought about by the fusion of lead pipes in the line of discharge. The substitution of brass and iron wherever lead is used in the construction of gas apparatus would, however, be attended with great inconvenience and expense, and, moreover, would not avert other dangers incident to the disruptive discharge from the conductor to the gas and water pipes within a building. I have therefore recommended that in all cases where lightning conductors are attached to buildings, fitted up with gas and water pipes, the lower extremity of the lightning conductor should be bound in good metallic contact with one or other of such pipes outside the building. By attending to this precaution, the disruptive discharge between the lightning conductor and the gas and water pipes is prevented, and the fusible metal pipes in the interior of the building are placed out of the influence of the lightning discharge.

Objections have been raised by some corporations to the establishment of metallic connection between lightning conductors and gas mains, on the ground that damage might arise from ignition and explosion. These objections are most irrational, as gas will not ignite and explode unless mixed with atmospheric air, and the passage of lightning along continuous metallic conductors will not ignite gas even when mixed with air. Moreover, in every case of the ignition of gas by lightning, the discharge is actually transmitted along the mains, such objections notwithstanding. A grave responsibility, therefore, rests upon those who, after introducing a source of danger into a building, raise obstacles to the adoption of measures for averting this danger.

The Blast Furnaces of St. Louis.

The manufacture of pig iron is well represented in St. Louis by eight blast furnaces, using principally the ores of this State, which are famous for their purity, and are peculiarly suitable for the manufacture of Bessemer pig. There are only two of the furnaces in blast, and they not running with their full capacity. All the following works are situated in the southern district of St. Louis, called Carondelet. They are on the banks of the Mississippi, and the main line of Iron Mountain & Southern Railroad and branch road of the Missouri Pacific Railroad running close to the buildings.

The Missouri Furnace Co. has two stacks, erected in 1868, with a hight of 56 feet each, the boshes being 13 and 15 feet. Both furnaces use the "bell hopper," with a diameter of eight feet. Each furnace has eight tuyeres; the blast is kept at a temperature of 850° to 900°, with a pressure of about three pounds. No. 1 will average 43 tons per twenty-four hours, but is out of blast now. No. 2 is now run at 36 tons. The ores used are the Iron Mountain and Southwestern ores; the fuel, coke, from Collinsville, Pa., and Big Muddy coal. There are two horizontal engines with steam cylinders 30 inches in diameter, six feet stroke, built by Collins & Holliday, of St. Louis; the blowing cylinders 78 inches, six feet stroke, and capacity of 16,000 cubic feet per minute, were made by J. B. Allen & Son, also of St. Louis. The product will average 93 per cent. of foundry pig, 80 per cent. of which is No. 1.

The South St. Louis Iron Co. has two stacks, built in 1869, with a common hight of 65 feet, and boshes respectively 14 and 15 feet; eight tuyeres to each furnace, with the blast at 850°, and 2½ pounds pressure. The yield will average 45 tons per 24 hours; the furnace now in blast producing from 38 to 40 tons. The two engines used were made by Collins & Holliday, an upright engine with steam cylinder, 32 by 7 feet stroke; two blowing cylinders, 54 inches by 7 feet stroke. The horizontal engine has a steam cylinder 33 inches and 6 feet stroke; two blowing cylinders 81 inches six feet stroke.

The Jupiter Iron Works has one stack never put in blast, one of the largest in this country, being 80 feet high with a bosh of 26 feet 9 inches.

The Vulcan Iron Works have three stacks, a description of which has lately appeared in our columns.

These companies have not only the advantage of transportation over the railroads centering in St. Louis, but also very cheap freightage by barges on the Mississippi, being able to penetrate as far east as Pittsburgh by the Ohio River, with access to the extensive iron and steel interest of Ohio in the same manner. Considering the superior character of the ores, fuel and fire clay, all within easy reach by rail or river, with the advantages of transportation above mentioned, it is reasonable to look for remarkable developments in the iron industry of this city.

Lighting of London.

From returns made in reply to government inquiries, the following remarkable particulars have been gained: The total amount of capital invested in the eight metropolitan gas companies is £10,000,000. The gross expenditures in 1874 amounted to £620,000, of which 75 per cent., or £470,000, was paid for new buildings and machinery; 20 per cent., or £122,000 for new and additional mains; and the remaining 5 per cent., or £27,000, for new and additional meters, fresh land and law charges. In mid-winter some of the largest gas works have to send as much as 17,000,000 cubic feet of gas in the course of the night. Some of the gasometers are now 140 feet in diameter and 70 feet high, or as large as a good-sized amphitheater, and have a capacity of upward of a million cubic feet. The gross quantity of gas supplied to the entire metropolis now is as much as 14,000,000,000 cubic feet per annum, which is at the rate of 38,000,000 feet per diem. To produce this enormous volume of gas about 1,500,000 tons of coal require to be carbonized or "coked" in the course of the year. Each ton of Newcastle coal produces on an average 10,000 cubic feet of gas and 1 cwt. of coal about 2½ bushels of coke. The cost of the coal alone for lighting London with gas amounts to £1,750,000 per annum. The value of the "residual products," such as coke, the breeze, the tar and the ammonia liquor, arising from the destructive distillation of the 1,500,000 tons of coal, is as much as £700,000 per annum. The "gas rental" of the entire metropolis is just upon £3,000,000 sterling, including rather more than £250,000 paid for public lamps, so that not quite £2,750,000 are paid for the gas supplied "per meter." The total length of the streets of London, according to Act of Parliament, is 2500 miles. The total length of the gas mains throughout London is probably 5000 miles. The number of street lamps throughout London is 54,000 odd, or one lamp to every 80 yards of roadway. The gross cost of erecting the 54,000 street lamps could not have been less than £135,000. The street lamps consume just upon 1,000,000,000 cubic feet of gas per annum. The gross cost of the gas consumed by the street lamps is upward of £150,000 yearly.

Eyesight of Locomotive Engineers

A communication has recently appeared in the English papers signed by Mr. Watson, surgeon of the Great Northern Hospital (Eng.), which is calculated to make railway travelers nervous in regard to the possibilities of danger in such traveling from a heretofore unsuspected quarter. This correspondent is actually "convinced" that it is a matter of some uncertainty whether the engineers in charge of trains are not often suffering from an affection of the eyesight. Mr. Watson's conclusions upon this important subject have been derived from professional attendance upon the late engineer of one of the fastest express trains. The condition of this man's power of vision was such as to preclude him from seeing at a distance beyond 20 feet objects which should have been visible at 200 feet. It is satisfactory to learn that this particular engineer, in the face of probable visitations of snow and fog, had the honesty to relinquish work which he could not have performed but with great risk to the public. It is far from clear, however, that every engineer afflicted with amaurosis would manifest so laudable an appreciation of the moral code as to resign lucrative employment out of consideration for the public safety.

People who prefer wetting the winter's store of coal to lay the dust on putting it in their cellars, do not, we believe, generally know that they are laying up for themselves a store of sore throats and other evils consequent upon the practice. But so it is said to be. Even the fire-damps which escape from coal mines arise from the slow decomposition of coal at temperatures but little below that of the atmosphere, but under augmented pressure. By wetting a mass of freshly broken coal and putting it in a warm cellar the mass is heated to such a degree that carbureted and sulphureted hydrogen are given off for long periods of time and pervade the whole house. The liability of wet coal to mischievous results under such circumstances may be appreciated from the fact that there are several instances on record of spontaneous combustion of wet coal when stowed into the bunkers or holds of vessels. And from this cause doubtless many missing coal vessels have perished.

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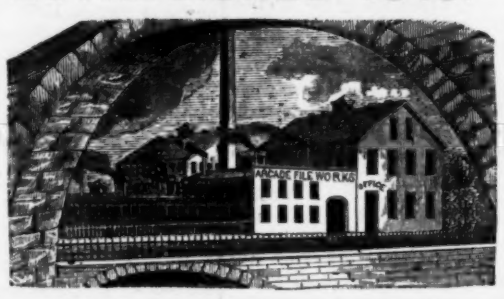

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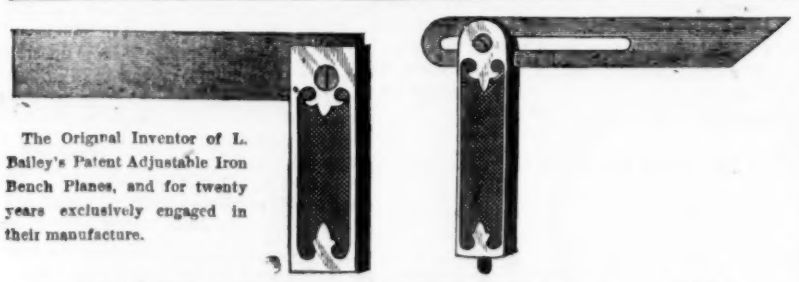

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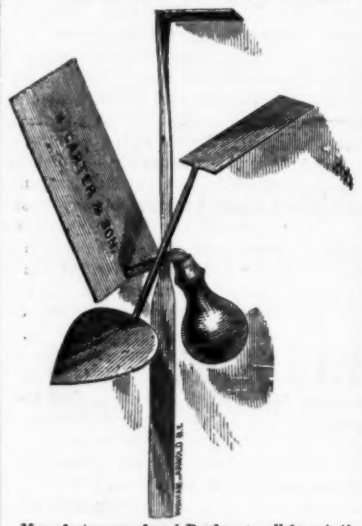

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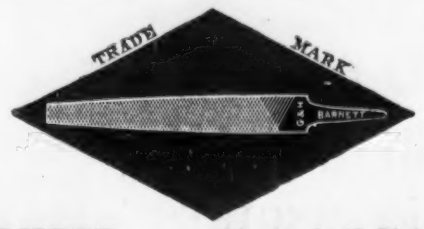

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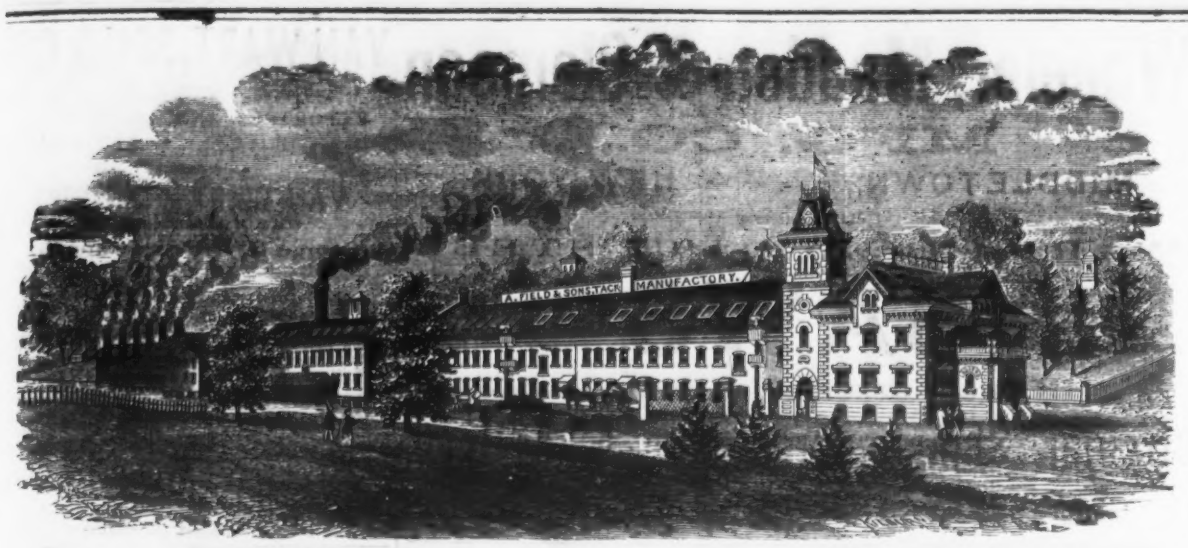

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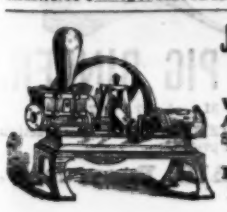

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Metal in Structural Decoration.

The tin foil decorations on the walls and ceilings of the Royal Aquarium, Westminster, are attracting much attention in England. The employment of brass, iron, zinc and other metals for decorative purposes in structures is of ancient date. The open iron work in the principals, spandrils, pierced screens, finials, &c., at the Royal Aquarium, Westminster, do not call for particular remark, but the coating of the walls and wood work of the reading room with tin is an application of that metal that seems worth notice. The tin foil is, it is true, the mere bearer of the decorations, rather than itself the decorator. Its functions are, nevertheless, novel and important, and have been performed with complete success. This work has been executed by the Tin Foil Decorative Painting Company, limited, of London and Paris. The works of the company are in the latter city. The process is the invention of M. Daniel, and originated at the time when Paris and France were in the throes caused by the war. It rapidly gained favor among Parisian architects, by many of whom it was adopted; amongst others, by M. C. Duchemin, architect and inspector of works of the new Louvre and of the city of Paris; MM. Blondel, Morel, Boudier, Isabey, Leroux, of the French Commission at the Vienna Exhibition; Lehmann, Marion, Peronne, of the Tribunal of Commerce; Ollivier, civil engineer, with many other architects and professional or private persons who have directed or ordered the execution of work. The material with which the walls and wood work of the room are covered or veneered is of what seems to be ordinary tin foil, presenting a normal appearance on one side, while the other is of an even color, or stenciled, printed or painted, to imitate a variety of the finest marbles, fancy woods and artistic subjects in great variety. The material is applicable not only to plain surfaces, but from its ductility to covering moldings and carvings, for marquetrie, and a variety of other uses. It supplies mural painting of a very fair character in a portable form. As regards artistic design, beauty of coloring, fidelity of the imitations of marbles and fine woods, the work at Westminster may be left to speak for itself. It may be conceded that the principal part of the work being really executed in the factory, the most elaborate decorations may be quickly applied in a public or private building, or in a place of business, without any necessity for its being vacated, and without the protracted discomfort and often long continued hurtful smells caused by the use of paint and the presence of paint pots in rooms of any kind. From the work produced it is palpable that well trained industrial artists are employed, in the first instance, in the production of such a variety of artistic subjects in boquets and vases of flowers, pastoral, classical and *genre* groups of figures, landscapes, objects in animated nature, as sheep, lambs, birds, fishes, center pieces, borders, &c. Probably there is this advantage in the process, that an artistic subject, when perfected in the first and most important stages of preparation, may be reproduced mechanically, *ad infinitum*, at a comparatively small cost. However this may be, it is obvious that the element of cost must materially affect the question of preference for this as compared with other methods of decoration. In grainings for imitations of woods, marbles, even colors, fleurs de lys, stars, and the like, the process has an advantage not likely to be disputed, but in the execution of artistic pictorial decorations according to exclusive original designs, the company may not be so successful in competition as regards price. An important advantage claimed for this metallic paper is that it is impervious to damp. This advantage, we venture to think, can only be secured subject to the condition that the wall is dry when the metallic surface is applied, or that the other side of the wall affords means of egress for the moisture. In case of a damp wall being covered on both sides with tin foil, and the damp thus hermetically sealed up, it will probably in seeking a means of escape prove too powerful for the metallic film and overcome its resistance. In case, however, of the adhesion holding good this valuable property of impermeability will be demonstrated, and will carry with it several important advantages. The decorated tin foil is applied by a sort of veneering process upon surfaces that have been polished with pumice stone. The completed work is varnished over, with one or more coats. If the pigments used in the decorations are to be relied on for permanency, the work ought to be very durable. The tin foil is, of course, non-absorbent, and the colors will be well preserved by the varnish on the surface. Re-varnishing from time to time will keep it in good condition. The sanitary advantages of such wall coverings are obvious, in their refusing lurking places for infection; in tropical climates also they will effectually resist insects. The aquarium reading room is about 50 ft. square, and 14 ft. high, the ceiling being much lower than it would have been but for circumstances beyond the control of the architect. It is lighted by a range of windows on one side, and by lights in the ceiling, which consists of four deeply coffered and highly enriched panels of equal size. A single column in the center of the room supports the beams upon which the inner sides of the four panels are formed. On three sides of the room there are on each side of the central divisions formed by the entrance door on one side, and fire places on the two others, ranges of three panels, that are surrounded by bands of Jaune Fleuri marble. The center panels of these ranges of three are decorated with vases of elaborate design, containing a variety of groups of flowers. The side panels have in each winged figures with flowers, &c., symbolizing the four seasons. The ground of the panels is in sea green, and they are adorned with a variety of medallions artistically arranged. Other and appropriate subjects decorate the panels on the side of the room in which the windows are placed, and in those over the door and fire-places. A number of well executed scenes, in circular frames, having relation to the principal panels, are carried round the room under the cornice. The deep skirting boards of the room are in Vert de Mer and in Griotte marbles. The column in the center of the room is covered with material to imitate Brocatelle marble. The ground wood work under the windows and the architraves is veneered with satin wood, mahogany and Algerian oak, all, of course, in the grained tin foil. The laying on of the material has been worthy of its artistic character. All the surfaces are perfectly covered, and there is no appearance of joints or overlaying in any portion of the work.

The Mass Copper of Lake Superior.

Prof. W. P. Blake says: The occurrence of enormous masses of pure copper has given the mining district of Lake Superior world-wide reputation. The first masses brought from there excited great attention and directed the notice of the mining world to the few particular mines from which they were taken. It may not now be generally known that nearly all the veins which are worked, and which cut across the trap ridge, contain mass copper, and that large masses are continually being raised from them.

The largest continuous mass which has been taken out was probably that from the Minnesota in 1857, which is variously stated as weighing 420 tons and 470 tons. Its length was about 45 feet, its breadth or hight 22 feet, and its greatest thickness 8 feet. All such masses are very irregular and ragged in their form and thickness, thinning out generally from a foot to a few inches, and struggling through the vein until they connect with other large masses. This was the character of a mass found in the Phœnix mine, one of the oldest on the Lake, which mass altogether weighed some 600 tons. But this was really a series of masses more or less connected by strings of metal, yet no one large part of it weighed, singly, over 300 tons. A similar series of masses, weighing about 600 tons, was extracted from the Minnesota. Some of the Phœnix masses were 4 to 5 feet thick of solid copper. The Cliff mine has yielded masses weighing from 100 to 150 tons in one piece. One of 40 tons was taken out this year, beside numerous blocks weighing from 1 to 8 tons. This mine and the Central are now yielding mass copper in abundance.

It is, of course, impossible to pick or drill, or to break out, such huge masses of solid metal, when they are found, by drifting upon the course of the vein; the method of extraction is as follows: The miner picks out, or excavates, a narrow passage or chamber upon one side of the mass, laying it bare as far as possible over its whole surface. It is usually firmly held by its close union with the vein-stuff, or by its irregular projections above, below and at the end. If it cannot then be dislodged by levers, the excavation of a chamber is commenced behind the mass, and this excavation is made large enough to receive from 5 to 20 or more kegs of powder. In the Cliff mine a charge of 21 kegs of powder threw down 200 tons of copper. Bags of sand are used for tamping, and the drift is closed up by a barricade of refuse and loose dirt. After such a blast the drift is, of course, charged with foul air, and it cannot safely be entered for hours afterward. It entered too soon men lose all strength in their limbs and fall down.

The huge masses of copper dislodged in this way are too large to be handled and got to the surface. They have to be cut up. The copper cutters are called in, and the mass is marked off into squares or blocks of suitable size. Copper cutting is a distinct art, and requires considerable skill and experience. Ordinary miners, however skillful they may be, cannot cut up copper without long training.

The tools used are simply narrow chisels and striking hammers. The chisels are shaped like the parting tool of turners. They are made of flat bars of half inch steel, about 2 inches wide and 18 inches long. They are chamfered each way like a cold chisel, to form the cutting edge. This edge is made a little longer than the thickness of the bar. The cutter holds the chisel and two men strike it. A thin slice, or chip of copper, is in this way cut out in a narrow channel across the mass of copper. The operation is repeated until the narrow cut, but little over half an inch wide, has been carried through the mass. The chips cut out in this way are long narrow strips of copper only half as long as the groove from which they are taken—the metal being condensed and thickened by the force of the blow. This work is necessarily slow and tedious, and it costs $12 per square foot by contract. At this price the cutters make $2 per day.

It is inconvenient to handle masses weighing over 6 tons. Such masses when hoisted are landed upon very strong platform trucks, and are then dumped in the rock house upon a large pile of dry pine logs. When a considerable number of masses have accumulated, the logs are fired, and the whole pile is heated to redness, for the purpose of loosening the very considerable quantities of vein-stone which are enclosed in the ragged cavities. This vein-stone consists chiefly of calcite, and after cooling it off it is so much softened that the greater portion can be knocked out by pounding upon the copper.

The masses are then marked, numbered and recorded, and are shipped to the smelting works, where they are melted down in reverberatories.

In the melting of this native copper there was an increase of weight, owing, doubtless, to the absorption of oxygen. It had been a matter of surprise to him that the pure barrel work from the stamps was not sent, at least in part, directly in the market, for the brass founders, instead of melting it, and casting in large ingots, which subsequently have to be broken.

The native silver was not separated from the copper by any mechanical separation, nor was it removed by smelting; usually boys picked it out as it came from the stamps, but the amount thus saved is insignificant.

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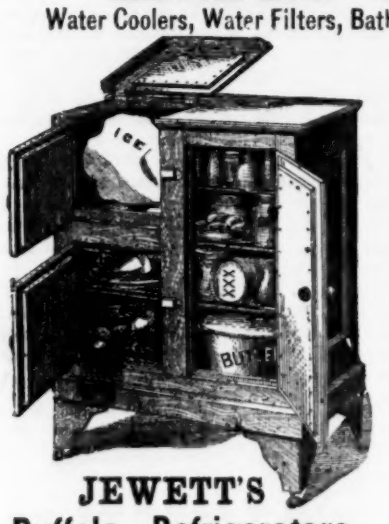

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Adapted to the various markets in the country.

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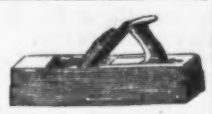

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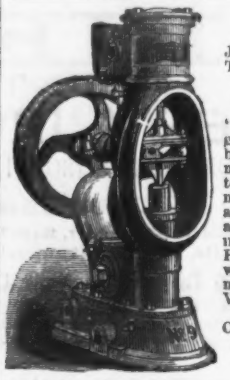

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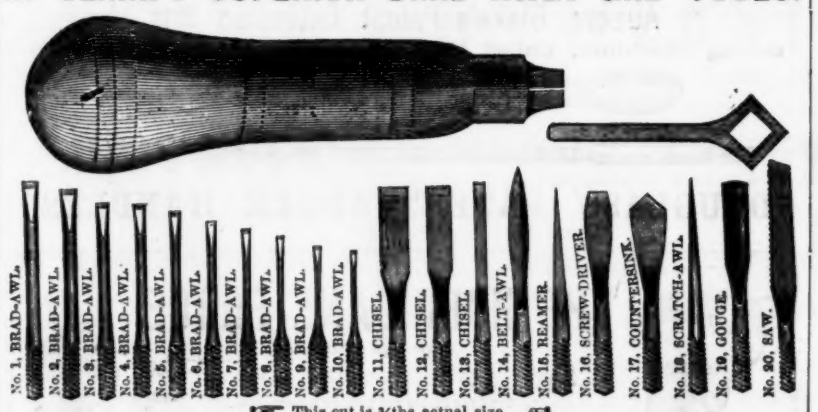

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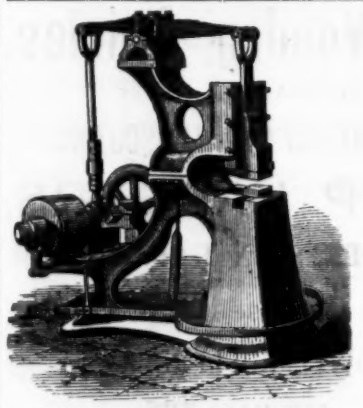

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E. BROWN'S STANDARD PORTABLE,

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Made by a new process **RECENTLY PATENTED** which enables me to produce goods that in quality, finish and general excellence surpass any. *All warranted Solid Cast Steel Blades.*

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Saves Ice, saves Ice Box, saves Labor. Made of Cast Steel thoroughly tempered. Manufactured by
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MANUFACTURERS OF SUPERIOR
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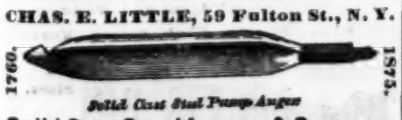

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All sizes in stock. Socket Shanks, Ring Handles, and Connecting Rods for the above to order. Also Tenoning Tools for joining log ends.

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AMERICAN PEN AND POCKET KNIVES,
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My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass. Mechanics' Ass'n Soc., 1868.

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WOSTENHOLM'S (IXL) POCKET KNIVES.
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The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.
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KANN & SONS MFG. CO.
Manufacturers of Albata & Britannia
TEA and TABLE SPOONS,
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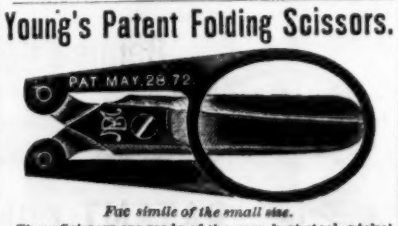
Young's Patent Folding Scissors.



Fac simile of the small size.
These Scissors are made of the very best steel, nickel plated, and so constructed that they can be readily folded and carried in the pocket without injury to the garments. A sample pair will be sent by mail, *to the trade only*, upon receipt of the retail price, namely:
For small size, either blunt or pointed.....$1·00
Large size, pointed or half pointed.....1·50
New York, Feb. 1st, 1876.
MARX BROS., Proprietors,
430 Broadway.

Stretches the wire each way, is tightened with a common wrench, is self fastening at each half turn of the spindle. Warranted for strength and durability. Sold at hardware stores generally. Byington & Northup, sole manufacturers, Rochelle, Illinois.

Agents: Hibbard & Spencer, Chicago; Excelsior Mfg. Co., St. Louis; John Nazro & Co., Milwaukee; George Fritch, Denver; Nelson & Co., Burlington, Iowa; Marshall Lefferts, Jr., N. Y.; J. S. Brown & Co., Galveston, Texas

PHILADELPHIA CORRESPONDENCE.

Office of *The Iron Age*, 220 South Fourth st., PHILADELPHIA, Feb. 15, 1876.

We have again to note an extremely dull week in business circles, and there seems to be no permanent life or activity in any department. Whatever favorable indications are seen seem to be only temporary, and everything falls back again into the same monotonous routine which we have been compelled to notice for many weeks past.

The coal trade in every department is excessively dull. The suspension of mining operations in all the regions is complete, and fifty to sixty thousand men are idle. The trade which has been so long struggling against these adverse conditions seems to have given up all hope, and several large houses have failed during the week. The demand for coal is very light, and the yards are glutted everywhere. It is not believed that stocks can be sufficiently reduced to warrant a resumption of work before the 1st of April. An arrangement was concluded on Thursday, in this city, between the combined companies for the year, and it is understood the Pennsylvania Railroad joins the combination. The coal trade of this company has been steadily increasing for some months, mostly in Bituminous, but connections have been made which must add largely to their Anthracite traffic. The stocks of nearly all the coal mining and transportation companies have been much depressed. Reading Railroad stock taking the lead, Lehigh Navigation and Lehigh Valley closely sympathizing in the decline of the former. This, however, is probably only temporary, but serves to show how far reaching in its effects is the present depression in the coal trade.

In the iron trade there is absolutely nothing to report except continued stagnation. Prices are nominally unchanged, but there is such an evident anxiety to realize when opportunity offers, that buyers have advantages which could not have been had a week or two ago. The demand is exceedingly light, and the increased business so confidently anticipated by many seems to be as far off as ever. Sales of steel rails are reported within the past few days at a reduction of fully $2 per ton from late rates, and at the reduced rates business is very quiet.

The iron shipbuilding trade, one of the most important interests on the Delaware, is still in a most depressed condition. The only work of importance at present in progress is the building for the United States government of four iron clads, each of about 6000 tons. Two of these are being built in this city and two at Chester. Notwithstanding the present stagnation there are good reasons for believing that it is only temporary. One of the leading builders in this city recently informed the writer that iron vessels can be built here quite as low in price as on the Clyde, the Thames, or the Tyne, assuming of course, that material, work and style are equal in both cases. The depression in iron shipbuilding appears to be equally as great in England as in this country, so that it would be premature to anticipate much improvement at present, inasmuch as the market is overstocked with vessels which can be bought or chartered on very easy terms, and, beside, the shipping business itself has been as much depressed as any other branch of trade. Probably this is not the case to such an extent as it was some months ago, and in view of the anticipated increase of travel to the Centennial, as well as the large foreign demand for our breadstuff, the pressure will be still less felt hereafter. There are special difficulties, however, which our shipbuilders have to meet in contending with their English rivals, as, for instance, the fact that the demand for vessels from our own merchants is comparatively limited, and chiefly for wooden vessels. England has for many years monopolized the iron shipbuilding trade, and being easily accessible to merchants of other commercial nations, and always on the lookout for buyers, has an immense advantage over our builders, who are so far distant from the market which has given England such a commanding influence in the trade. Another point in favor of that country is in the abundance of capital, and the ease with which loans can be negotiated, and where large contracts are in progress with foreign nations it will be seen at once how important it is to be in immediate proximity to the world's financial center. Still, the facts being as stated, there is no reason to doubt that our shipbuilding interests will continue to grow in the same ratio as other branches of trade, and while there is no doubt our home demand will eventually be very large, our builders would do well to look to other countries, and thus establish their claim to a share of foreign business, by proving that, quality considered, they can furnish as good an article and at as low a price as can be done in England.

We have it reported to us (on respectable authority) that arrangements are now pending for the building of five first-class new iron steamships to run in connection with the Panama Railway Company. The proposed line, it is said, will be organized by the stockholders of the Panama Railway Company, and will be in opposition to the Pacific Mail Steamship Company. No definite contracts have yet been entered into, but it is expected something will be done within the next few days. It will be remembered that the Panama Company, some months ago, were restrained by an order from the courts from entering upon the business themselves, but the new line, though under a separate management, will be largely, if not completely, identified with the Panama Railway Company.

Messrs. William Cramp & Sons are engaged in building a mammoth dry dock, capable of accommodating the largest sized vessels, and when completed will be of immense advantage to the port. The work was commenced about the first of the year, and is expected to be completed about the first of May, and give steady employment to 700 to 800 men.

A new paper making machine, probably the largest ever made in the United State, has just been completed at the Gavit Machine Works. The total length of the machine is 90 feet, the weight over 50 tons. It is termed a 98-inch Fourdrinier machine, and is capable of making a sheet of paper 92 inches wide at the rate of 125 feet per minute. The machine was built within eight weeks from time of commencement, and is intended for the *Public Ledger* Mills, near Elkton, Md.

Ornament.

In reviewing a new book on the laws of taste as applied to ornamentation, *Iron* says:

There was a time—and a time within the memory of our oldest inhabitants—when the beginnings of life and the revelations of history were deemed not so far distant that future ages might by deep study overtake the beclouded past and reveal, by the light of science, the dawn of life and of men's history; but life and history, like the bespangled heavens, the more they are studied and peered into by science, the more they reveal and the more they recede from view. For this reason we shall not attempt to trace the origin of ornament, as some have done before us, for, like life's history, it would seem to have been coeval with language, with which, in fact, it has many affinities. Like it, it expresses a want, and originated in a desire to name or to claim; in other words, to distinguish. The savage who made the first cross on his flint spearhead was not only the father of the written language of the country in which he resided, but the patriarch of the eighty-two distinct heraldic crosses of Columbier and the two hundred and fifty variations of his successors. If, too, that savage became a warrior of renown, not only would his spearhead become to his successor as choice as a fiddle on which a Paganini has played, but a fetish which should be bowed down to, and perhaps further marked by its successive possessors or deemed too sacred for touch. Not that we have at present sufficient examples to write the full history of the evolution of ornament from the cross or any other distinguishing mark of the savage, up to its highest worship in Gothic cathedrals of elaborate designs, any more than the naturalist has every link to connect the hyperion with the horse or the stagonolepis with the crocodile, but sufficient is known to record the leading characteristic, and the remainder is merely a reading between the lines as in a palimpsest or a Babylonian record.

And this we state that the students of ornament may be on their guard, so as to distinguish between styles, and not confound like ornament with like origin, except in the matter of like want, as many have done when tracing the derivation of words or of rites, and latterly in more than one case of ornament. Thus confounding the language of ornament, confusing its "grammar" and making decorated work like macaronic poetry which lacks wit and wisdom. Nor even when we adhere to one style of ornament, should we slavishly follow it, grinding out ovule and mutule, capital and base, abacus and toros, like schoolboy Latin verses, which can be better done by machine. Indeed it is this very inane copying of cusp and stringcourse, crocket and pinnacle, trefoil and cinquefoil—well enough in boys learning a language—which has led to that recent revulsion against Gothic ornament, and brought in Renaissance Queen Anne, with a threat in the future of the Georgian wall-and-hole style of house, leading to the eternal round of nothing new under the sun.

Now we thus refer to building as one of the methods in which ornament may be expressed, from its continual presence, and therefore continued corruption of taste. There was a time, and that only a decade since, when there were hopes that our architects—having learned to lisp in Gothic—promised to utter boldly their own ideas; but that time seems to be passing, for all the young architects worship le Grand Monarque, with his artificiality, his powder, patches, paint and perruques, or Queen Anne and the Georgian gross life and degraded taste which followed thereon. Notwithstanding this, the architect daily complains of the engineer and his want of taste, mainly because he is not always consulted in the erection of those spacious buildings connected with the carrying commerce of the country.

No doubt the man of taste has reason to complain of our stations, docks and warehouses, but they, at least, answer their end; and if the shell be uncouth, the kernel is sweet and sound, while often with the architect the shell is ornamental after "a fashion" and the kernel is bitter and cramped for space. The engineering work of the country is at present healthy and growing, and is perpetually presenting evidences of its becoming more ornamental, and taking, if need be, its stand alongside of architecture, or even superseding it, if need be, should the architects wilfully continue their downward course.

The true artist does not depend altogether upon material—the style is the man—yet it is impossible for him to produce the highest kind of work out of the roughest substance. The architect or the sculptor may have a course freestone supplied him, and so work with the odds against him, whilst the engineer, though not depending under all circumstances upon iron for his constructions, uses it so freely that it may be considered his sheet anchor. Now we know pretty well what can be done with iron from what has been done; and there is no material on the face of the earth to excel it in utility, for it may be massive or light, may cast a ship, support a cannon, bear a tower, or be twisted like tendrils of the vine, forged into stamens and buds, or hammered into petals and leaves, or intertwined, like gossamer web, to adorn the bosom of beauty. Seeing, then, that we have such a supple material for our artistic tastes and conceptions, and such an opportunity for the display of them, it ill becomes us to allow the position to slide from our hands or slip from under our feet, because we fancy that to-morrow will be as yesterday and to-day. In the matter of iron work, except in solidity, we are not ahead of other nations, and barely abreast of them; but if we add to the majesty of strength the grace of form we need fear nothing; none can excel this combination and few have equaled them. That we have now all the means and every opportunity of educating ourselves, and more certainly our children, is patent; for the race for precedence is evidenced by the foundation of schools of art and the printing of such books as have furnished us with the text on which we have hung these few remarks on ornament and its origin.

L. COES'

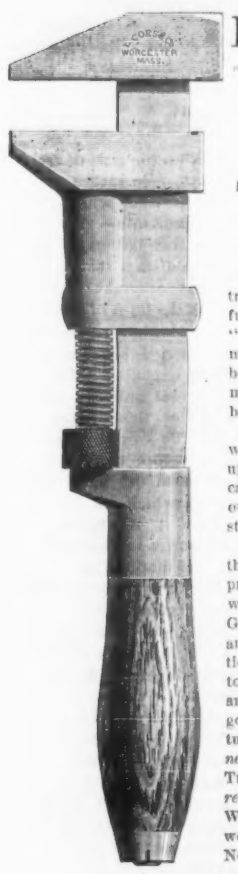
Genuine Improved Patent

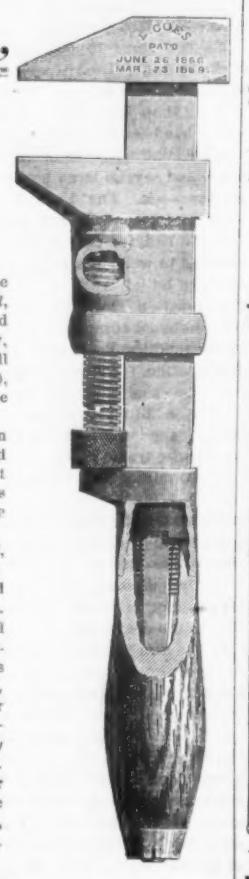
SCREW WRENCHES.

Manufactured by

L. COES & CO.,

Worcester, Mass.





Established in 1839.

Registered March 21, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

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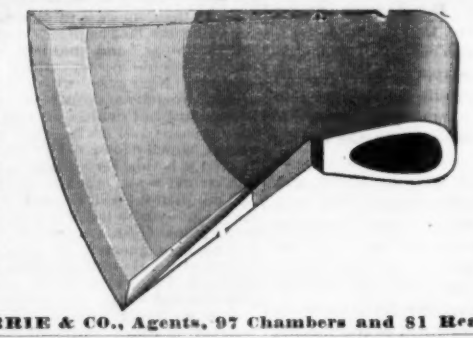

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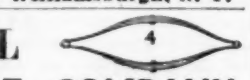

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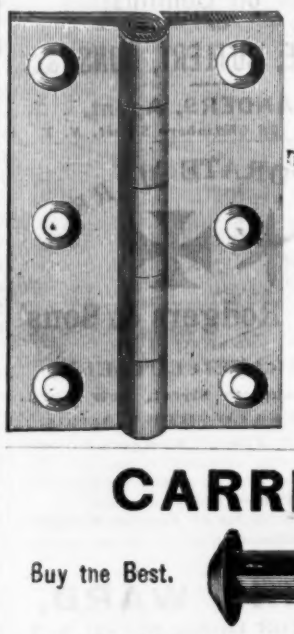

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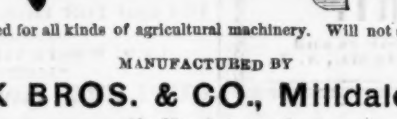

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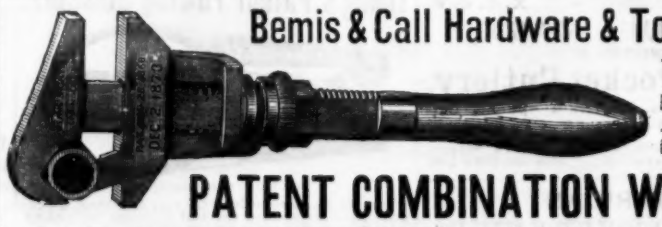

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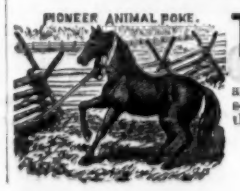

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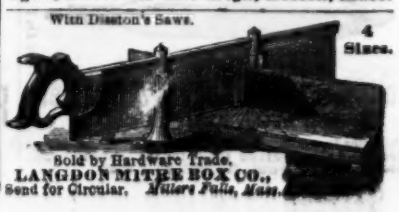

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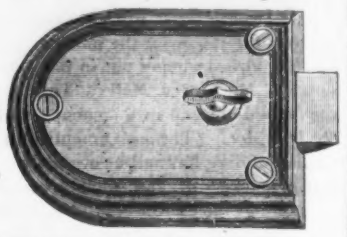

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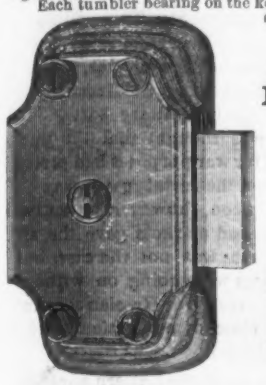

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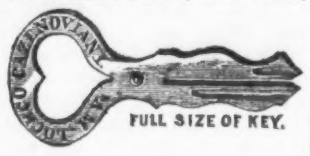

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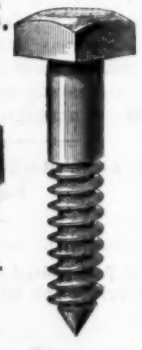

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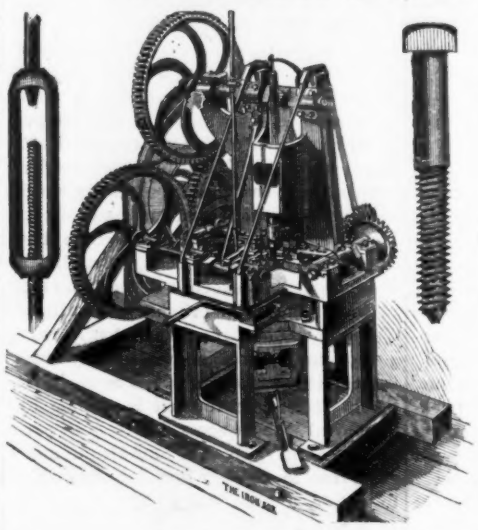

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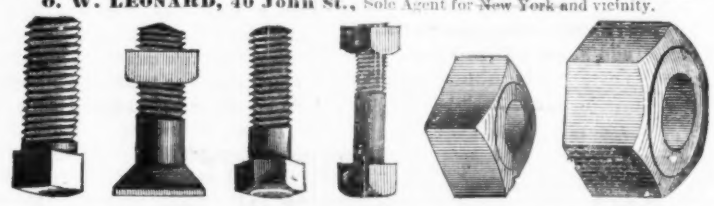

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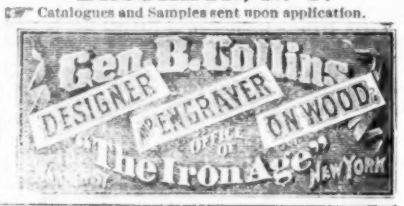

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Young Mechanics.

The commercial and industrial history of the country during the past few years, teaches many practical lessons of especial interest to young men. We are not of those who consider it their duty to make life a burden to the young by continually preaching platitudes to them, but a few words of kindly encouragement to young mechanics may not be out of place in the columns of a journal which reaches not a few of them in workshop and factory.

During the long period of national prosperity which began with the end of the war and continued almost without interruption until the panic, there was much to shake the popular faith, and especially the faith of the rising generation, in the wisdom of those sage moral and economic precepts which had come down to us from our forefathers. For the homely adage "honesty is the best policy," we had substituted the more popular advice of the old worlding, Polonius, to his son, Laertes, "put money in thy purse." To make a fortune rapidly and without other labor than that involved in planning, plotting and scheming, became the ambition of a majority of young men, especially those who "had life before them". The end was everything; as to the means by which it was to be attained, the only consideration which need be given them was to see that they were successful. When money became plenty and cheap fortunes were easily made, some men became contractors and counted their profits by hundreds of thousands; others manipulated the various markets, and by timely speculations and schrewd "corners," reaped wealth where they had not sown; others took their little capital into the gold room or the stock market and grew rich in a day. Of course many failed where one succeeded, but those who failed dropped from public notice, and there were enough of those who succeeded to make success seem easy. The vast expenditures of the national government encouraged extravagance in all departments of state and municipal government, and a vast army of office holders and political managers stole or squandered the millions which the people paid without complaint. As the natural and legitimate outgrowth of these demoralizing influences, the standard of morals in public and private life declined rapidly. Men who had prided themselves upon honorable dealing, gradually came to regard with lenient judgment evasions of the law for profit, and even false swearing when a small gain could be secured and the government be cheated of some share of what was due it. Extensive industries—for example, the manufacture of spirits—were carried on in open defiance of the law, and everything tended to impress the youth of the Nation with the idea that the end and aim of all human effort was to grow rapidly rich by whatever means offered. There were few means of making money which would so taint a reputation as to exclude the successful man from a conspicuous place in society. Those who went down unsuccessful and dishonored were regarded as "not smart," which was as bad in the public estimation as crime.

During this period of feverish excitement, the substantial success achieved by honest and well directed labor attracted but little attention. Young men threw away their books and rushed from the school room into the busy circle of the world's activities, with a great ambition to become rich and a profound contempt for those who were content with the modest profits of plodding toil. Comparatively few of those who at that time entered the mechanical trades, did so willingly. They seemed to offer no opening which would satisfy any one with a spark of ambition; and we have no doubt that a very large proportion of apprentices looked with envy upon clerks who enjoyed liberal salaries, wore good clothes and were in the line of advancement to positions in which they could direct and control vast agencies of distribution and gain, if successful, profits which would amount in a day to a mechanic's earnings for a year.

Now let us see whether the young men who chose the mechanical trades were more or less fortunate than those who entered commerce. Long before the panic, the distributive industries of the country were overcrowded with men of mediocre talent. Clerks were plenty and cheap, when there was the greatest demand for their services; when this demand suddenly decreased, when wages were cut down and a vast multitude were discharged, there remained but little foundation for the bright prospects with which a majority of the young men in business had entered life. Then began the weeding out process. Fortunes easily made, in many cases easily melted; merchants and speculators were daily bankrupted by the score; the possession of ill-gotten gains gave those who had them anxiety and trouble; and it became evident that honest is the best policy, after all, and that the homely virtues of prudence, economy and thrift are worth more in the long run, than more brilliant qualities not held in check and balanced by sound judgment and sterling integrity. The past three years have been bad years for those who "lived by their wits," and during the next ten years, at least, the man with a trade will be better off than any other man in the community without capital and with no more than average talent. The changes brought about by recent events have, we hope, dispelled the illusions which filled the minds of the youth of this country. We are learning to call thieves and swindlers by their right name (a few years ago they were financiers and statesman), and to appreciate more fully than in our days of national delirium the value of the services of those who are engaged in production. Labor is daily gaining dignity and importance, and the ambitious young mechanic who will apply himself to acquiring a thouough mastery of his trade, theoretical and practical, starts out with ninety-nine chances in favor of success to one which the man has who engages in business as a clerk. His future will be pretty much what he may choose to make it. The distributive industries of the country have long been, and probably always will be, overcrowded; in the productive industries there always was, and always will be, plenty of room for mechanics who are thorough, honest, temperate and conscientious. Such men are always in demand. Panics and seasons of depression may affect them more or less, but these cannot rob them of their capital gained at the bench, the drawing table and the evening fireside. There is no class of men so absolutely independent of chance and mischance as mechanics. Opportunities constantly present themselves to such men which do not come often to clerks and bookkeepers, and there are no positions to which they may aspire which are not within the reach of the first-class mechanic. If more of our intelligent young men with good educations and good social positions would learn the various mechanical trades, fewer of them would have occasion in after years to bemoan the wasted opportunities of youth and the fruitless struggles of an unsuccessful life. The young mechanic needs no sympathy or commiseration in this age of the world's progress. If inspired by an honest desire to attain excellence as a workman at any present sacrifice of comfort or pleasure, and willing to study the literature which modern book making has placed so easily within his reach, his chances of success in life are far more numerous and certain than those of any other class of young men in the community, not excepting those who look forward to the inheritance of millions. Young men must remember that learning a trade to-day does not necessarily imply the entering a workshop as a mere day laborer. The time for that is passing by. Technical schools, accessible from all parts of the country, give the foundation, and a short time in the shop is sufficient in which to obtain a good knowledge of a trade. It remains, then, to acquire the skill of hand and practical experience. High class men, who are not only expert workmen, but have theoretical knowledge of their business, always command good wages—sometimes extravagantly high. They are doubly valuable when, with this knowledge, they have the executive ability to control and direct manufacturing operations. Then the openings before them are sufficiently numerous to satisfy the largest ambition.

The Centennial Preparations.

We visited last week the several buildings of the Centennial Exhibition, and were the better able to appreciate the magnitude of the work accomplished, for the reason that the last time we had occasion to inspect the grounds, Lanesdown Terrace lay an unbroken stretch of green sward, with only a flag-staff to mark the spot where the main exhibition building would stand. During this interval, which seems scarcely more than a few months, an amount of work has been done which is simply amazing. More than fifty buildings are now in various stages of construction, most of them so nearly completed that the only work remaining to be done upon them is inside decoration. Many more are proposed, and before the exhibition opens it is probable that as many as a hundred buildings will stand within the spacious enclosure of the Centennial grounds. The scene, as viewed from one of the high towers of the main building, presents a varied and busy appearance. A great deal of work yet remains to be done upon both grounds and approaches, but it will all be completed in good time. A brief description of the principal objects of interest to the visitor at this time, made from somewhat hurried notes, will give some idea of the stage of the work of preparation.

The main building is very nearly finished, with the exception of the central tower. Its vast extent cannot be indicated by any description, but it is safe to predict that no one will be disappointed with its size, appearance or arrangement. The foreign commissioners are already beginning to partition off the spaces allotted to them, and the work of unpacking the goods which have already arrived will soon begin.

Machinery Hall is finished. It covers seventeen acres, which is three acres less than the area of the main building. The boiler house for the great Corliss engine which will supply power, stands north, and is about ready for its roof. It will contain twenty large, upright Corliss boilers, to make steam for the monster engine which is already being put in place in the center of Machinery Hall. This engine was fully described in a recent issue of *The Iron Age*. The assignments of space in this building have all been made. The floor is marked off, and each space bears the name of the exhibitor who is to occupy it.

Horticultural Hall is finished, and is the most interesting of all the buildings at this time. It already contains the government exhibition of rare plants and flowers, and will be a center of attraction during the whole time of the exhibition.

The work upon the Agricultural buildings is backward, but will be finished in time. The Government building is very nearly completed.

Memorial Hall, the only permanent structure on the grounds, is receiving its inside finish, and is filled with scaffolding for the use of the plasterers. It is a building covering one and a half acres, built of granite, and is of great beauty. It is approached by a flight of granite steps, on either side of which will stand colossal bronzes which the workmen are now putting together. It has been found too small to accommodate the art department of the Exhibition, and another building, temporary, though substantial and fire-proof, is going up near it to supplement its capacity. Memorial Hall would make a magnificent State House, and we should not be surprised to see the Pennsylvania Legislature considering the propriety of meeting in it after the Exhibition is over.

Of the other buildings it is unnecessary to speak at length. The mild weather of the winter has been peculiarly favorable to the progress of the work, which would have suffered serious interruption from extreme or protracted cold. Everything, even to the grass lawns, is promised to be in readiness by the day of the opening, and such work as is under the control of the United States Commissioners undoubtedly will be. If there is any delay, it will probably be the fault of the several foreign commissioners.

Iron Making in the South.

The *Miners' and Manufacturers' Journal*, of Tracy City, Tennessee, republishes our article on iron making in the South, and concludes its comments with some statements which it asks us to lay before our readers. We do so with pleasure:

The Tennessee Coal and Railroad Company, now strong enough to make good its contract, at a point between Chattanooga and Nashville, and on the line of the leading railroad in the South, will furnish ore—a good variety and capable of making first-rate iron at $5 per ton of pig metal. Coke at 6 cents per bushel, and limestone at 50 cents per ton of iron, and we will procure contracts for the transportation of pig metal in Cincinnati at a cent a ton per mile, or $3 62 per ton.

We ask the following questions:

1. Upon these figures what will it cost to put a ton of iron in Cincinnati?
2. Can Pittsburgh compete with us?
3. Suppose we get to manufacturing our own pig metal into rails, nails, stoves, bridges, fences, houses, etc., where will the competition come from that will interfere with us?

Being in the business of mining and shipping coal and making coke, we make this offer, because we can make a profit furnishing the raw material at these prices, and we will furnish any quantity desired.

If we are to understand by this that the Tennessee Coal and Railroad Company will guarantee to supply furnaces with coke at 6 cents per bushel, delivered, in any required quantity, we should say that the offer was a good one. All things considered, however, it would seem as if $5 was a high price for ore to the ton of iron. The Chattanooga Furnace gets its ore at $4 per ton of pig metal; but on the basis above given, it would seem as if the product of a well built, economically managed coke furnace should be able to compete successfully with Pittsburgh iron in any Western market.

The Lead Markets of America and Europe.

The supply of lead in this country during the past year, as compared with that of the previous one, has been as follows:

	Tons. 1875.	Tons. 1874.
Import on this coast	7,305	18,000
Government sales	915	4,000
Product of Missouri, Iowa, Illinois and Wisconsin	22,053	20,500
Desilverized in California, Salt Lake City, Omaha, Chicago and on this coast	31,200	26,000
	61,473	68,500

The supply last year consequently fell short some 7000 tons as compared with 1874. Our consumption of white lead during the current year is estimated at 45,000 tons, and it is believed that we shall not be able to turn out enough domestic soft lead for corroding purposes to meet the quantity thus required. Our importation both of common and soft lead from Europe has been gradually decreasing of late years, and declined materially last year, as is shown above, and for various reasons. The consumption of lead for all sorts of purposes is rapidly on the increase in Europe, and causes prices to remain high. The plumbing trade there has become more extensive yearly. The introduction of modern improvements has made great progress, not only in large cities but in those of medium size, and has extended to country seats. An advanced civilization, greater luxury, and travels to England and the United States, have brought this about. Pipe and sheet lead is now in more active request in those markets, and for the purpose of imparting to cottages a neater appearance outwardly and inwardly, a larger consumption of white lead has grown up than was considered probable in former years. Aside from this, the European nations, without an exception, have gone on increasing their armaments. These military reorganizations have become a fatal necessity since the Franco-German war, on account of the sudden aggrandizement of Germany on a purely military basis. In October last it was thought that the purchasing of lead for war purposes had pretty much ceased, and the metal gave way in consequence. Soon, however, attentive watchers of the lead markets gave the assurance that such was not the case, but that the purchases were going on without uninterruption, except for Russian account as long as the close of navigation at the northern ports lasted.

The resuscitation of the Eastern question contributed its share toward a continuation of armament. Germany, it is asserted, has now finished its new organization, and the amount of available forces between that country, Austria and Russia is at present estimated at 7,100,000 men. By the time the latter two shall have completed their military reorganization, it is estimated that the three can jointly equip and place on a complete war footing 11,000,000 soldiers. Next comes France, whose forces will number 2,000,000 soldiers two years hence, in an emergency. Italy and the rest, even Belgium and Switzerland, although deemed neutrals, are compelled to follow the example of the great powers, and the budgets of each are swelling in proportion. The quantity of lead which these colossal armies will need to place them on an efficient war footing is simply enormous, and the subject deserves the attention of the metal trade at large. Russia alone last year took 15,000 tons from Western Europe.

While the demand for the supplying of Europe alone thus promises to be as great as ever, China continues to import the better kinds for tea box lining on an extensive scale, not to speak of the large consumption of other trans-Atlantic and trans-Pacific countries.

The military aspect of Spain, which furnishes something like 65,000 tons of lead, is therefore invested with special interest. As long as that country remains in a politically and industrially unsettled condition, production there will be either crippled or withheld for war purposes. Although the government has an army of 240,000 men in the Peninsula, and the Carlists do not boast of more than 30,000 to oppose them, the latter hold strategical points from which it seems difficult to expel them, and the war may last another twelve months. In consequence, therefore, of the prospect of an increased consumption of lead in Europe and an inadequate supply, the markets over there have been improving ever since fall. In December prices advanced between 15/ and 20/ per cwt., and the tendency at last accounts was still a steady one on the Continent, while in England a slight reaction has occurred.

There is but little prospect that supplies of soft lead for corroding can be brought to this country from abroad at reasonable prices. Hence, the great activity that has been displayed in the West and elsewhere in producing the same in quantities sufficiently great to meet the expected growing demand here. The sooner we can free ourselves of dependence for soft lead upon Europe the better, and this is what our producers have been aiming at. The prostration in business during the past two years has, moreover, contributed not a little to discourage importation. Should the demand for white lead in the ensuing spring come up to expectations, however, we do not see that we can wholly meet it from domestic sources. Strong hopes are, furthermore, entertained that the consumption of common domestic lead for articles in the plumbing line will increase during the current year, and that a good spring trade awaits us. These expectations, after two years of comparative dullness, seem reasonable enough, but they are contingent in their fulfillment so much upon the turn which general business will take, that it will be safer not to rely too much on this hoped for revival. A sudden quickening in any one branch of trade is not likely, but we may with a fair amount of certainty look forward to a gradual, solid revival, based on exhausted supplies in dealers' and consumers' hands.

How the Market is Broken for Manufactured Iron.

If all reports concerning the price of manufactured iron are laid up to the charge of their originators, there will be a long reckoning for some of them as the result of the past 15 months. We do not say that many falsehoods have been told, but if a falsehood be a circle, these stories are tangents. We have had some experience in getting at the truth of the reports of low prices, and we have found in almost every case that the market has been broken by misrepresentation as to the price at which a rival was selling. For example, when bars are firm, say at 2·40, a buyer has an order, 20 per cent. of which is common bars, and the balance extras—hoops for instance. He makes out two lists, one containing the entire order and the other only the extras. He takes the latter to a manufacturer who makes hoops only, and gets a bid at 2·20, and immediately goes to another manufacturer who makes all kinds, with his order that includes the bars, and states that he can get his order filled at 2·20. No. 2 gets mad and takes the mixed order at 2·20, and at once the report goes out that bars are selling at 2·20. Scores of times when iron is reported as being sold in the West at very low figures, they are only the base on which extras are sold, and the quotation does not include straight bars; but some one hears the quotation, gets angry or frightened, and then the low quotation becomes the market price.

Let us take another case, of which we have personal knowledge. Bars were being sold in the West at 2·40, firm. The report was started that a Pittsburgh mill had taken an order for 200 tons of all bars at 2·20. At a meeting of the Western Iron Association, held about this time, the charge was made, and every Pittsburgh mill denied it positively, stating that it had been offered and they had refused the order. At last one Pittsburgher stated that he heard that it was taken at Cleveland. Cleveland had the floor, and positive denial was again given. When the order was traced, it was found at last that it was taken at Erie, Pa., by the Erie Rolling Mill. The grain of truth and the misrepresentation in all this will appear when it is known that the machinery in the Erie mill is that of a Pittsburgh mill moved to Erie, and that there is a mill at Cleveland called the Lake Erie. It is in just such stories as this that the market has been broken again and again during the last 15 months.

We have in mind a case of cutting in tacks. A Western dealer came East to buy. The first dealer to whom he offered his order quoted the association price, and the bid was rejected. To test the matter, the dealer asked the buyer if 33⅓ off the list, which was far below the standard price, would take the order, and was told it would; but the dealer positively refused to sell at any such rates. The buyer left his office, and went to that of a rival, stating that No. 1 had offered tacks at 33⅓ off. No. 2, without inquiry into the truth of the statement, sold the tacks at 33⅓ off, and trouble was the consequence. When being charged with the misrepresentation, the buyer confessed that No. 1 had refused to sell at the price, but he thought he didn't mean it.

We could multiply these examples almost indefinitely, but it is needless. What we desire is to show that in many instances the market is broken through positive misrepresentations of buyers. We do not assert that it is always so. Sometimes a manufacturer's necessities compel him to sell, and then he must take what he can get; but often, if iron men had a little more confidence in each other, the market would be much firmer.

It would also be well to remember that the Eastern and Western cards are very different, and that a low card rate West on extras may make those extras in some cases not much, if any, below the Eastern card. All these things should be considered before a manufacturer lends himself to break the market on representations that his neighbor is doing it.

The Pennsylvania authorities seem to be in earnest in their endeavors to bring to merited justice the "Mollie Maguires" who have so long been the terror of the eastern and central coal regions of that State. One of these desperados has already been convicted of murder, and the men arrested for the killing of Policeman Yost, near Pottsville, are now on trial. Kerrigan, the one convicted, has agreed to make a clean breast of it, and will, it is understood, expose the secrets of this infamous society. The court proceedings are conducted in secret. It certainly is time for the good name of the great Commonwealth of Pennsylvania that measures be taken to purge herself from crimes such as these in the East, and of the murder of the Italians in the West, near Pittsburgh. The miners prate of liberty and confound it with license. They know they are a power in the land, and that votes tell. Presuming on this they have been guilty of crimes that would excite the indignation of the world were they committed by the brigands of Italy and Greece. Were an American to be murdered in one of the passes of the Alps, with what grace could our government demand the punishment of the murder, when the murder of the Italians on that peaceful Sabbath morning, at Elizabeth, is still unpunished? Gov. Hartranft struck the right note in his message when he said: "Every man must be allowed to sell his own labor at his own price, and his working must not be interrupted either by force or intimidation." To protect every man in the enjoyment of this right is the duty of the Commonwealth.

The Price of Boiling in Pittsburgh.

There are in the United States, in round numbers, 4200 puddling or boiling furnaces, one double furnace being counted as two single ones. Of these, about 2700 are either in Pittsburgh, or the price they pay for boiling iron is governed by the price at Pittsburgh directly; that is, it is either so much per ton more than Pittsburgh prices or so much less. At Wheeling, for example, it is 25 cents per ton more; at another point which we will not name it is 25 cents less. Beside, at many points East which are not controlled directly by these prices, they have no inconsiderable influence. In a word, Pittsburgh is the battle ground for prices of boiling.

It is this which causes so much interest in the conferences that have been held at Pittsburgh during the past few months, and which may give value to a brief review of the changes that have taken place in the price of boiling within the past year.

For several years prior to November, 1874, a scale based upon the card price of iron was maintained. This was based on a 5 cent card, at which the price of boiling was $8 per ton, and declined 10 cents per ton with every one-tenth of a cent decline in the card until the card reached 3 cents, below which no provision was made. At this date—November, 1874—the selling price of iron had gone far below 3 cents, and the manufacturers stated this to the boilers and asked them to consent to a reduction. The demand was $5 for boiling on a 3 cent card and decline as before—10 cents with every one-tenth reduction in the card. This was refused, and a strike was the result—or, rather, a "lock-out"—which lasted until April. In the meantime the card on iron had declined, and at last a compromise was effected by which the scale was extended to 2·5 card, in the same ratio as the old, which would make boiling at 2·5 card $5·50. This price lasted through the summer. The custom had been to pay what is called the "hot dollar," an extra dollar per ton during the summer months, but it was not paid last summer.

In the autumn another attempt was made to reduce the price, which succeeded, the price being $5 without a scale. On December 16th, after considerable discussion, the price was again reduced to $4·75, at which rate it was to stand until February 14th. This was a compromise, the manufacturers demanding $4·50.

On Saturday last a committee of the boilers and manufacturers met at the rooms of the Iron Association, Pittsburgh, to consider the price, and, after a long discussion, the following was agreed upon:

MEMORANDUM OF AGREEMENT BETWEEN THE BOILERS AND MANUFACTURERS.

As far as their trade will warrant, the mills will continue in operation. The price for boiling for the present shall be suspended. The Conference Committee shall meet again on Monday, February 21, at 7 o'clock p. m., and if a price shall then be agreed upon it shall date from February 14. Should the conference, however, fail to agree upon a fixed price, all work done in the meantime shall be at $4·75 per ton.

For the manufacturers,
H. W. OLIVER, JR.

For the boilers,
JOSEPH BISHOP.

The conference was one of the pleasantest yet held, and the adjournment was at the request of the boilers. It is understood that the manufacturers asked for $4·50, and it certainly seems as though this were a fair price. Though the card on iron is 2·5 it is well known that iron is selling much below this. A long ton of pig will not make much more than a net ton of finished iron. With the selling price at 2·2 we would have $44 as the price of a net ton of bars. Take from this the cost of pig $22, ore say $2, coal say $3, and at $4·50 per ton the puddler would have nearly a quarter of what is left, without taking any account of the many expenses that enter into a ton of iron.

It must be remembered that at present there is no scale of wages, the price paid being purely an arbitrary one. From what we can learn we think the manufacturers of Pittsburgh would agree on a scale of $5 per ton for boiling at 3 cents card, and decline 10 cents for every 1-10 decline in iron.

We publish on another page two interesting communications, one from a stove manufacturer in Troy, and one from a gentleman who has long been engaged in the business of selling stoves in the West. They consider the evils affecting the stove trade from different standpoints, and will be read with interest. We hope to hear more from the retailers on this subject.

The Chilean Exhibition.

It will be remembered that the international exhibition at Santiago, Chili, was opened on the 16th September last. Manufactures are well represented, but the classification is defective. Thus carriages from the United States and England are in one and the same department, while those of other nations are grouped elsewhere, and this bad arrangement extends to a hundred different articles. Originally the plan of exhibiting the articles had been good enough, but the Germans having monopolized the entire central gallery, confusion has spread among the subdivisions allotted to other industrial nations.

In forwarding machinery the very practical idea has predominated among the various contributors to send on only such goods as would administer to the usual requirements of every day life in Chili. England, Canada, the United States, Germany and Belgium have sent, above all, saw mill machinery, oil and wine presses, turbine water wheels, pumps, and mining as well as agricultural machinery.

The locomotives to be found are mostly of the heaviest kind, but there is alongside of them a light one from the United States, the Pitt locomotive, much less expensive, and destined to become a serious rival to the English ones, thus far the only ones introduced on the Chilean railroads. Messrs. Frith, of Sheffield, have forwarded a vast collection of tools, and from the United States we find the famous hatchets and axes, unsurpassed in point of temper and proportions.

Unexcelled are furthermore the light carriages from the United States, which have been forwarded thither in endless variety, but altogether too frail for Chilean roads, and not adapted to the country.

Steel Fire Boxes.

It is a very trite and well worn saying "that experience is the foundation of all knowledge." It is, nevertheless, true that very few individuals realize the importance of the proposition, or place a proper value on the lesson which it conveys. Experience is undoubtedly the foundation of all knowledge, but knowledge is a comparative term, and the same thing may be said of experience. Nothing, perhaps, has done more to hinder the progress of scientific truth than the assumption that a given experience is final. A man conducts a series of experiments, he obtains results capable of being formularized, and he at once claims that his deductions from this experiment must be sound. The mistake he commits is that he regards a chapter as a whole book, a single grain as a sample of the contents of a sack. The error assumes its worst phase when a man with a strong bias handles it. Given an engineer with a strong prejudice and a ready pen, put him in possession of the results of a few experiments, all tending one way, and we have at once an element of possible error let loose which may do enormous mischief. To what, it will be asked, does our homily apply! In the present case we limit its application to the use of steel for locomotive boilers. We have been told from time to time that steel is the metal of the future; and numbers of engineers believe that the statement is true. It must not be forgotten, however, that the truth or falsehood of the statement can easily be determined at any moment, if only experience enough in the use of steel be available. If this experience has not yet been obtained, then the steel party cannot claim to be infallible, and every objection urged against steel and in favor of iron—in the use of which the world has ample experience—is deserving of very careful attention. On the other hand, it is equally clear that, in common justice, all arguments in favor of steel should be carefully weighed. There can, however, be no greater waste of time than that involved in a discussion of the merits of steel as a constructive material for any given purpose, which is based on theory only. To say that steel will not answer for any given purpose in the absence of experience is absurd—quite as absurd as to say, while lacking definite information, that it will answer. Now, for some time past a vigorous attempt has been made by steel makers to prove that steel is a better material for guns, and ships, and boilers than iron. Of course, there is an interested motive at the bottom of the movement. It would be a good thing for steel makers if iron were turned out of the market in favor of steel. But we do not say that the motive is an improper motive, nor do we believe that any respectable steel maker claims for his metal more than he honestly believes it deserves. Let us, however, remember that in discussing any scientific question, the first and only thing which we have to secure is truth—absolute truth—irrespective of every other consideration. Now, if we deal with this question—the merits of steel as a material for boilers—in this spirit, we shall find that the advocates of steel have yet a great deal to do before they can establish anything like a good case in favor of the use of that material for the specific purpose we have named.

For many years iron and copper were the only materials used in the construction of steam boilers. It cannot be denied that, on the whole, they have given satisfaction. Before we are justified in adopting a novel material, we should satisfy ourselves that the new material possesses advantages which entitle it to the preference. Now, what advantage can steel possess as a material for boilers? A very little reflection will show that it can possess but one or two. It is not a better conductor than iron, and it is not cheaper, nor is it less subject to corrosion. It is claimed, however, that, being harder than iron, it resists abrasion from the particles of fuel better, and that it is, consequently, in this sense, more durable. The great advantage which is claimed for it is, that possessing more tensile strength than iron, boilers can be made much thinner, and consequently lighter, of steel than of iron. We believe that all other claims in its favor have been practically abandoned. Is it true that steel boilers can be made lighter than iron boilers of equal strength? This is the only point, perhaps, about the whole controversy, worth discussing. What does experience say on the subject? The answer from this side of the Atlantic is against steel. We shall show in a moment that at the other side of the water the result is the same. In Great Britain few, if any, stationary boilers, and no marine boilers, are made of steel. Mr. Webb, of Crewe, makes steel locomotive boilers, and possessing as he does a remarkable exemption from the troubles that beset other locomotive superintendents, his steel boilers give him, we understand, no trouble. It is well known that steel if hard will not answer for a boiler. On one of our principal railway lines eighteen steel fire boxes were recently put into as many new engines. The steel was really a beautiful material. It could be bent cold into a double knot. When hot it would assume any form the fancy of the smith suggested. Here was really the much sought for metal of the future. The engines had not long been at work, however, until leaking tubes and leaking boxes began to become common. Experience proved in about three months that the new material was utterly unsuitable for fire boxes, as not only all the tubes, but all the joints leaked, and these steel boxes having been condemned, have at this moment either been all taken out and replaced by copper boxes, or they will be taken out in a very few weeks. The metal here was too soft. With harder metal the result is hardly less unfavorable; it is not an unusual thing for a hard steel fire box plate to come bodily away from the flange two or three days after the flanging has been done. It is not too much to assert that steel has not been successfully used in this country as a material for boilers, save in a very few insignificant instances, always excepting, we presume, the practice of Mr. Webb, about which he is remarkably reticent.

The last copy of the Transactions of the American Railway Master Mechanics' Association contains a report "On the Operation and Management of Locomotive Boilers, including the Purification of Feed-water;" and of the discussion which followed. About the purification of feed water we shall say nothing just now; we shall confine our attention principally to the use of steel for boilers. The report is extremely valuable and interesting as a record of the results of experience. We propose here to give only a few of the general conclusions arrived at by the reporting committee, as it would be impossible to deal fully with so important a subject in a single article. It appears, then, that in the United States, where steel fire boxes are used in wood burning engines, the result is quite satisfactory. "Steel fire boxes, with wood for fuel, are giving general satisfaction." The pressure carried is 120 lbs.; the stays are four inches apart. Will any English locomotive superintendent follow American practice, and carry 120 lbs. in boilers the fire boxes of which are made of steel plates one-fourth of an inch thick? When bituminous coal very similar to that used on English railways is the fuel employed, the steel boxes do not give satisfaction; on the contrary, they are subject to cracks. The cracks occur after a service of from six months to two and three years. "These cracks invariably take place in the side sheets. The crack starts about seven inches from the grate bars, in the center of the length of the fire box, and extends vertically from ten to thirty inches long; sometimes straight between the stay bolts; at others the cracks are zig-zag from stay bolt to stay bolt, and opening about one-sixteenth of an inch in the center of the crack. The fracture is sometimes accompanied with a loud report; at other times no report is made, and the trouble is discovered by the water running out. Some have cracked when the boiler was being filled with cold water; some when the boiler had been standing for twenty-four hours with the same water as when the engine came in from a trip, and no disturbing cause whatever. Others have cracked on the left-hand side when workmen were riveting up stay bolts on right side of fire box."

It will, we think, be agreed that this result is not very encouraging. If steel fire boxes can only be used in conjunction with wood fuel, then it is obvious that the utility of steel as a material for fire boxes is extremely circumscribed. The committee deal very fairly with the matter; they are satisfied that there is something about the action of bituminous coal on steel plates which they do not quite understand, and they explain the failure of steel on the assumption that it is not uniform in texture, and that it absorbs sulphur from the coal: "Different causes have been assigned for the cracking of the sheets, among them unequal expansion and contraction, running cold water into the boiler, want of uniformity in the steel, and from the steel having an affinity to sulphur, and gradually absorbing it, until the nature of the steel becomes changed, and the fracture takes place. Your committee are of opinion that one of the last two is the cause of the trouble. If it was the expansion and contraction, all should crack; but of the same class of engines, and same make of steel, one will run, and the fire box remain good, while the other will crack. Your committee believe that the metal, as manufactured, is not uniform. They also believe that some chemical action not fully understood takes place between the gases and the steel when the coal is being consumed in the fire box. Your committee are of the opinion that the manufacturers of boiler steel should take this matter in hand, and produce a uniform metal; also, to investigate what changes, if any, take place in the metal after being exposed to a bituminous coal fire. They all claim to employ expert chemists about their works, and should do this for their own interests."

As we are only placing the gist of the report before our readers just now, we shall refrain for the time from all criticism on the foregoing extract. In the course of the discussion which followed on the presentation of the report, a good deal was urged in favor of steel boxes, and their advocates were driven to very curious shifts to explain why they cracked. One of the principal arguments was that they cracked because they were not properly annealed, or because, having been annealed, they were exposed either to sudden rushes of cold air or the influx of cold water. Some of the speakers, however, adduced facts which went to show that annealing had nothing to do with the matter. For the moment we must leave the subject, with the reflection that a material which, it is acknowledged by its warmest advocates, must be used with the utmost tenderness—one on which no breath of cold air must blow—a material so treacherous that a fire box which had run 27,000 miles has been ruined by letting cold water into the boiler 36 hours after the fire had been drawn, is one which it is hardly advisable to adopt in English locomotive practice.—*Engineer.*

Boston and Philadelphia Express.

The *North American* gives the following interesting particulars in relation to a through express from Boston to Philadelphia without change of cars:

Arrangements have been completed for the running of express trains between Boston, Philadelphia and Washington, without change of cars, to go into effect on or about April 3. The morning express will leave Boston at 9 o'clock, and reach Philadelphia at 9 p. m.; the evening express will leave Boston at 9 o'clock, and reach Philadelphia about 8 o'clock the following morning. The trains will leave Boston by way of the New York and New England Railroad, formerly known as the Boston, Hartford and Erie, connecting with the Providence, Hartford and Fishkill Railroad at Willimantic; thence by the latter road to Hartford; thence by the New York, New Haven and Hartford Railroad to New Rochelle; thence by the Harlem River branch of the New Haven Railroad to the Harlem River; thence by the steamer Maryland, which is provided with tracks for the accommodation of trains, down the Harlem and East Rivers, around the Battery and across the North River, to the depot of the Pennsylvania Railroad at Jersey City; thence by the Pennsylvania Railroad to Philadelphia and Washington.

The running time between Boston and Philadelphia will be from eleven to twelve hours, without change of cars, while the delays and inconveniences of the transfer from the Grand Central Depot to Jersey City will be obviated. Each train will have Pullman drawing room or sleeping cars attached. The trip of the steamer Maryland between the Harlem River and Jersey City will occupy about 45 minutes. On the upper deck there will be a first-class restaurant. Cars are now building expressly to run through on the new route.

For the successful accomplishment of this scheme we think the chief credit is due to Mr. Kenney, the superintendent, and Major Charles K. Ide, the Master of Transportation, of the Philadelphia, Wilmington and Baltimore Railroad, the latter of whom, in the face of considerable opposition, clearly demonstrated its entire feasibility by planning and establishing a through line between this city and Boston for the transportation of peaches, without breaking bulk or change of cars.

The well-known French chemist, M. Gaillete, has continued his researches into the absorption of hydrogen by iron, with some interesting results. It appears that when an iron plate is attacked by sulphuric acid being poured over it, a portion of the hydrogen produced is absorbed by the metal, and the pressure of the gas which is accumulated between two iron plates, welded together, is sufficient to counterbalance a column of mercury 13¾ in. high. This singular property of hydrogen, which has also been confirmed, lately, by the investigations of M. Sevox, is regarded by the latter as a most interesting discovery, and he attributes to the presence of carbonic oxide, or hydrogenized gas, the brittleness which some classes of iron manifest when an attempt is made to draw them into wire, a fact well known to workers in this metal. It is also found that, when decomposing by the galvanic battery a solution of chlorate of iron to which sal-ammoniac has been added, metallic iron may be collected at the south pole in the form of a brilliant wart, brittle and often hard enough to scratch glass. This iron after being washed evolves, either under water or another liquid, numerous bubbles of gas, which is pure hydrogen. When freely exposed to the air, galvanic iron loses only a portion of its hydrogen; under water, especially water heated to 140 or 150 deg., the hydrogen is given off with violence. As to the quantity of hydrogen iron thus treated can take up, it seems that, for one volume of iron, the amount is two hundred volumes of gas; in weight, thirteen parts of iron absorb one part of gas. When a lighted match is applied to this iron saturated with hydrogen the gas burns like alcohol.

H. D. SMITH & CO.,

Plantsville, Conn.,

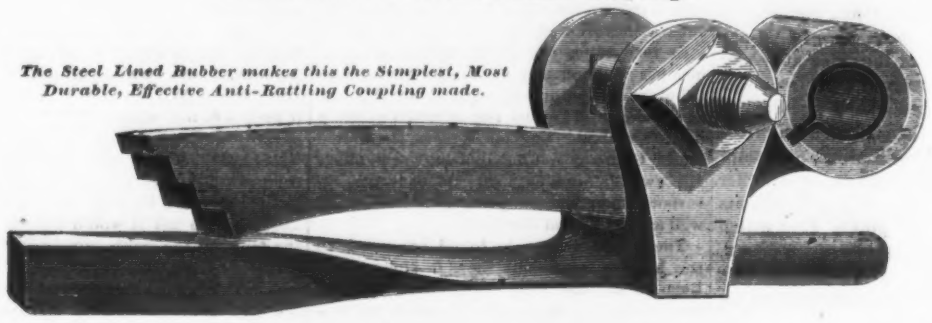
Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Patent Whiffletree Bolt, Bent Pattern.

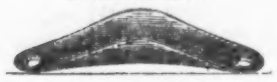
Smith's Patent Noiseless Shaft Couplings.

The Steel Lined Rubber makes this the Simplest, Most Durable, Effective Anti-Rattling Coupling made.

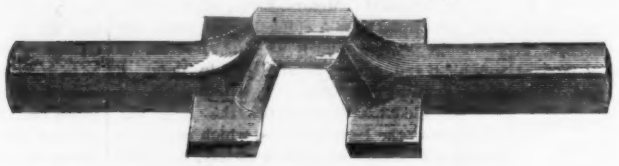


Spring Brace.

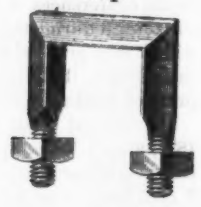
Felloe Plate.



Patent French Coach Clip.



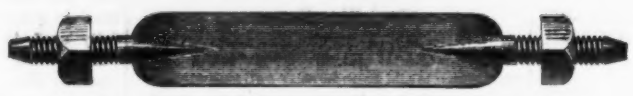
Short Spring Clip.



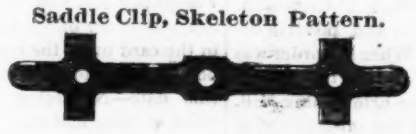
New York Slat Irons.

Saddle Clip, Octagon Pattern.

Plain Pattern Axle Clip.

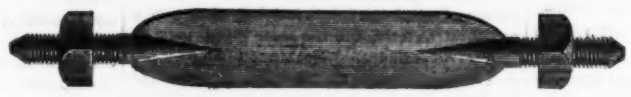


Saddle Clip, Skeleton Pattern.

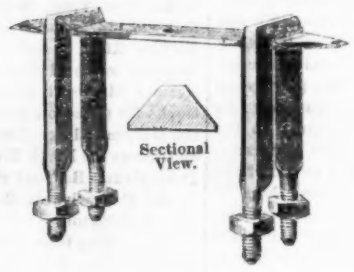


Philadelphia Slat Iron.

"The Anvil" Axle Clip.

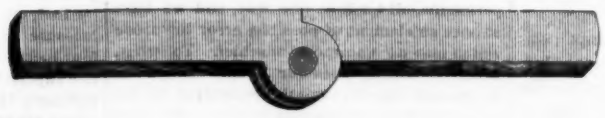


Sectional View.



Spring Bar Clip.—Smith's Pattern.

Smith's Milled Stump Joint.

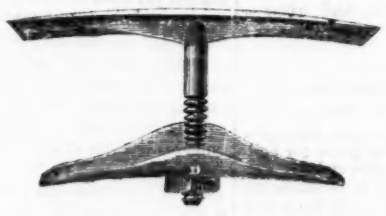


Axle Saddle Clip.

Clip King Bolts.

Improved Shaft Bolts.

Felloe Holders.



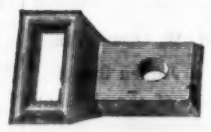
Coach Axle Clip.

Brewster & Co. Patent Whiff Plate.

Loop Yoke.

Axle Clip Yoke.

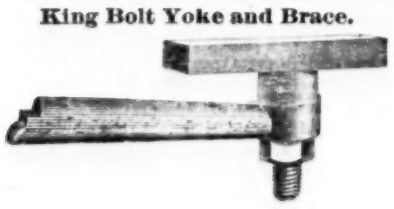
Safety Loop.



Brewster & Co. Pat. Felloe Joint Bolt.

Cross Bar Step.

King Bolt Yoke and Brace.



5th Wheel Anti-Rattler.

Thomas Top Prop.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED

SEND FOR PRICE LIST.

Two Direct Cutting Edges instead of One Scraping Point.

$1000 Challenge that the Lightning Saw is the Fastest Cutting Saw in the World. It will do more work, day in and day out, and I will back It against any responsible manufacturer.

BEWARE.

N. B.—Some Northern Jobbing Houses, in the interest of infringers, are selling old damaged goods at less than they can replace them.

E. M. BOYNTON,

80 Beekman Street, New York.

Manufacturer of all Kinds of

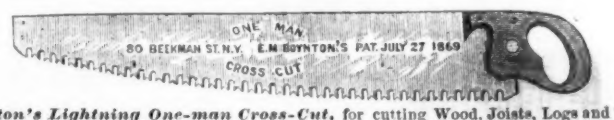
First-Class SAWS.

Also, SAW FRAMES, PATENT CROSS-CUT HANDLES, SAW SETS, FILES, and Sole Proprietor

Of the PATENT LIGHTNING SAW.

The attention of the trade is especially invited to the vindication of my Patent Saws as shown by the published Decree, Injunction and Costs of U. S. Court, of September 2d, 1875. In the mean time the other varieties of Clearing Teeth Saws have been overthrown and pronounced invalid. My Patent M Teeth alone stand as the only vindicated and protected Patent for Cross Cut and Buck Saw Teeth. I shall proceed at my leisure to make it interesting to infringers, having retained Gen'l Butler and other excellent counsel. ☞ My advice to the trade is to cease selling counterfeits of my goods. I will make any of these imitation goods at prices as low as they can be made, of good material and workmanship, while I will furnish the genuine Patent Lightning Saw at 50c. per foot by the dozen. Special terms made with the jobbers and agents for quantity.

Boynton's Patent Lightning Cross-Cut Saw. Price 50c. per foot, Set and Sharpened.



E. M. Boynton's Lightning One-man Cross-Cut, for cutting Wood, Joists, Logs and Timber, and sawing down trees, to which can be attached one of my Patent Adustable Handles, removable at pleasure. Complete, ready for use. *Price, 60c. per foot.* Sizes, 3, 3½, 4, 4½, 5, 5½ and 6 feet. Millions of Axes are in use, where, by using this Saw, half the time would be saved, and no waste of fuel occur.

Frame made of best seasoned stock, and warranted the stiffest adjustable braced frame in the market. Gives universal satisfaction. (30 inch) complete, with Lightning Blades, $8·50 per doz. 100,000 sold and cannot get enough of them made *perfectly* at my own manufactory.

This cut represents the use of my special files, made to fit the angle of the teeth, dressing both points at a single blow, making the saw the simplest and cheapest to file in the world. The shortening of the tooth the thickness of a sheet of paper (which is all any single tooth penetrates) leaves but little dressing necessary. For the undulled edges of the cutside of M, the third surface of the file is all that will be needed. They are made 2d cut of highest quality. By the use of this file all difficulty is removed, and the cost of filing Lightning Cross-cut Saws at the factory is two cents per foot; buck saws four cents each. The cost of the 10 inch for cross-cuts is $4·20, net, per dozen; 5 inch, for buck saws, half price. A large stock kept constantly at my store in Beekman street.

10 INCHES LONG.

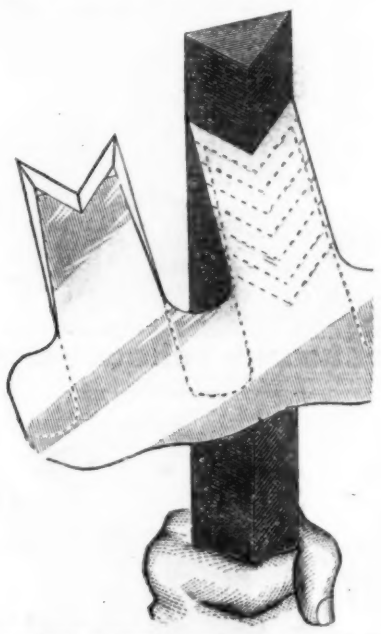
BOYNTON'S PATENT SAW-SET.

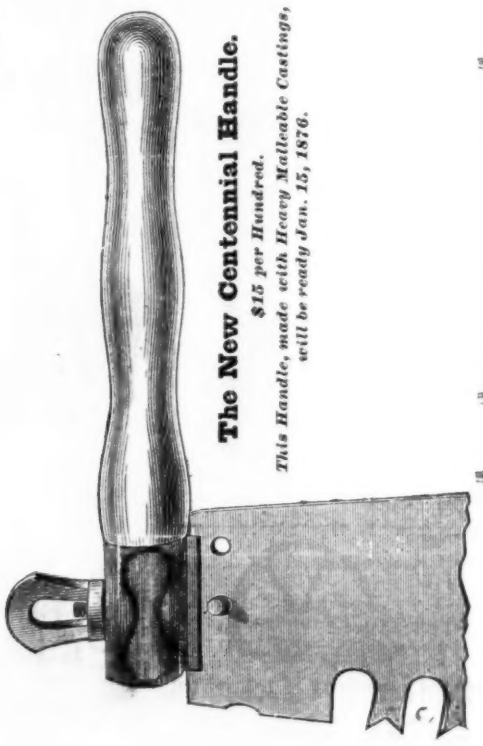
PATENTED NOVEMBER 25, 1873.

Best cross-cut saw-set in the market. A blind man can use it. Sets any kind of a cross-cut saw. Always ready for use; adjusted by a single thumb screw. Can set a saw in field or forest, without any other tools, as well as in a saw shop. No prying, wrenching or hammering in setting, like most other saw-sets.

DIRECTIONS FOR USING.—Simply hold saw in left hand, and then place set on saw tooth, as represented in cut, so as to rest on the gauge, then with right hand bring handles of set together, and the tooth is set. If more set is required, draw gauge back so set can take a deeper hold of tooth. It will also set my Lightning Buck Saw Blades, both points of teeth at once. It has only to be used to be appreciated.

Price, per dozen, $8·40 net; sample sent by mail to dealers on receipt of $1·00.





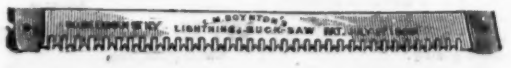
The New Centennial Handle.

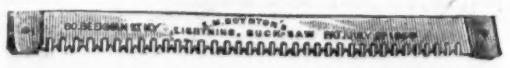
$15 per Hundred.

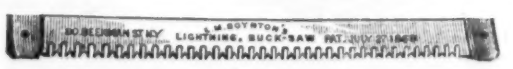
This Handle, made with Heavy Malleable Castings, will be ready Jan. 15, 1876.

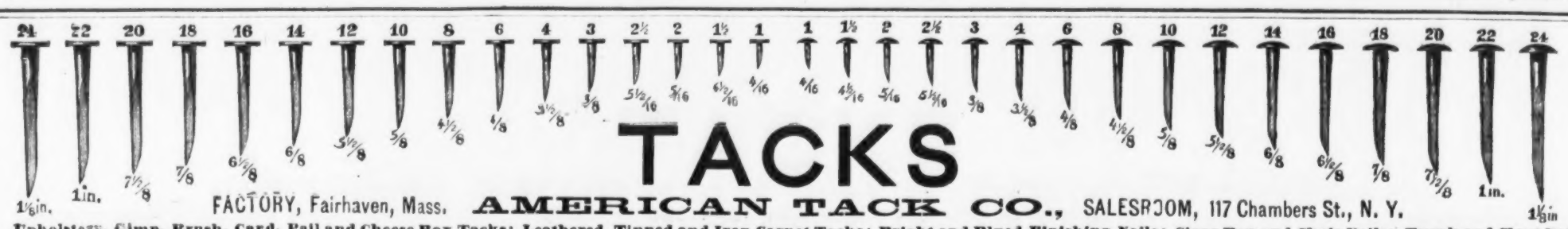
My genuine Patent Lightning Saws still lead the American market, and are shipped abroad extensively. No manufacturer dares question this or submit his saws to a public test trial. I offer $500 for expenses. My efforts within a few years have trebled the sale of Cross-Cut Saws. While I have prospered, the public have been educated in scientific timber cutting—no small thing when it is asserted that a Billion Dollars is the annual Wood, Lumber and Timber crop of America—four times the value of our wheat crop. The immense waste in cutting wood with axes is almost incredible; any one engaged in cutting cord wood will tell you that the tough and knotty timber and chips are wasted, when they may become good stove wood, if the logs are cut short with my cross-cuts, as blocks of one foot in length are *easily hauled and split.* The savings of timber and time by the scientific use of saws, it is computed, would equal the annual interest on the U. S. public debt *saved,* and the toil of millions of farmers be lightened, if they will only learn to use saws. Every clearing tooth saw has no other *cutting* teeth but the old V, and is, therefore, necessarily inferior. It has, however, an M shape clearer, and if the speed is due to one M in three teeth, why not treble the improvement by using all M teeth? A Champion Raker M does no *cutting,* but to prevent its clearers catching, it is kept 1-16 inch short, six average *cuts* of 1-100 inch short, and therefore its only mission is to remove dust that may be choking up the arches. As a shovel it is useful; but my Lightning plow teeth, *all of even length,* require no shorting or gauge, clear as they cut simultaneously, which is better than the old process of wearing off timber. *This* is why *no* manufacturer *ever has dared* test publicly against my Lightning Saw, which was awarded the highest *Silver Medal over all competitors* at last American Institute Fair, the same as usual.

The teeth of an ordinary cross-cut saw are usually one inch dust space. If an ordinary log saw has fifty teeth employed in cutting a log, and if a progress of ¼ inch each motion is obtained, the cutting of each point would be 1-50 of ¼ inch, or 1-200 of an inch, the thickness of a very thin sheet of paper. If we allow a cut of double the amount, still but a hundredth of an inch is used. Now, by filing out the middle of my tooth, thus M to the undulled edge, which will require but slight edging, it is evident the shortening of an average filing will reach up *inch instead of the point of steel of other saws, or thrice the money.* thus saving the shape perfectly, and *economizing a square durability, without gumming, thus saving files, time and*









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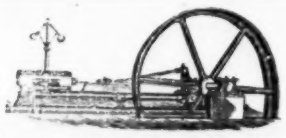

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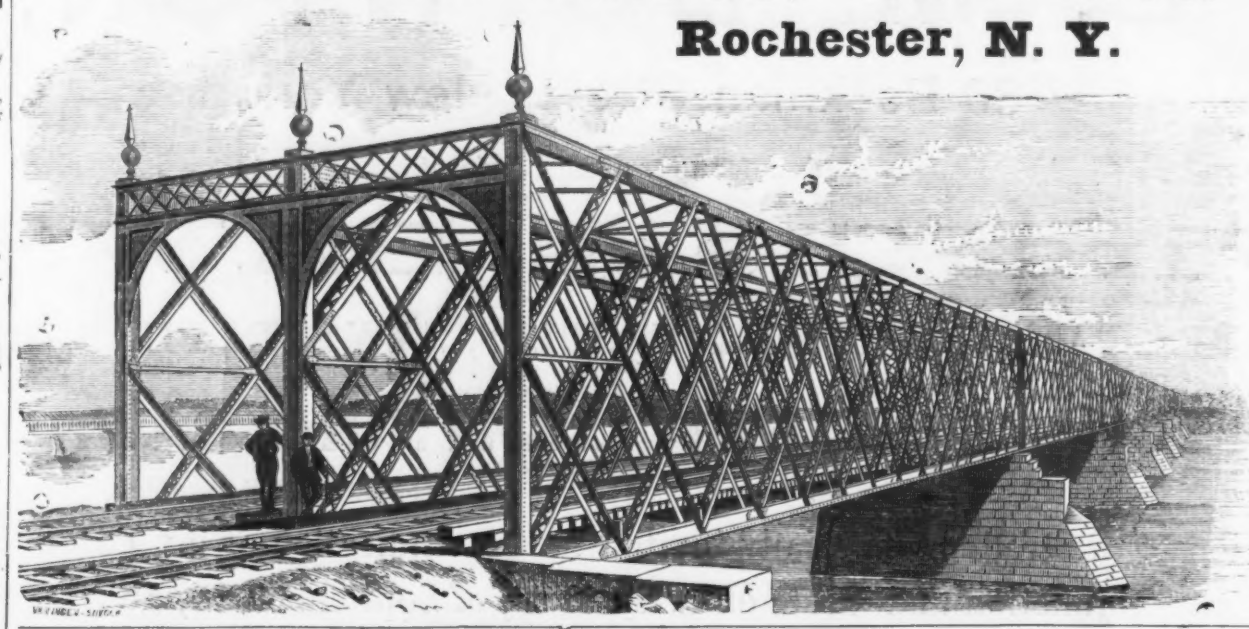

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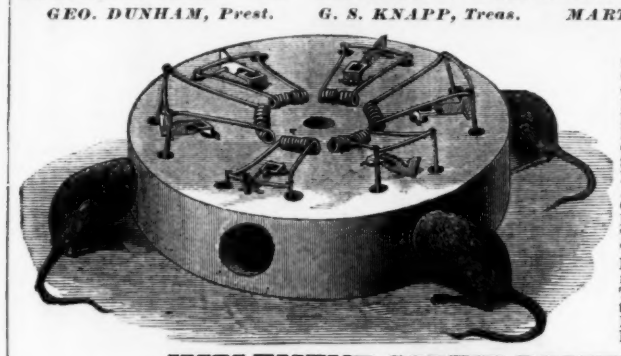

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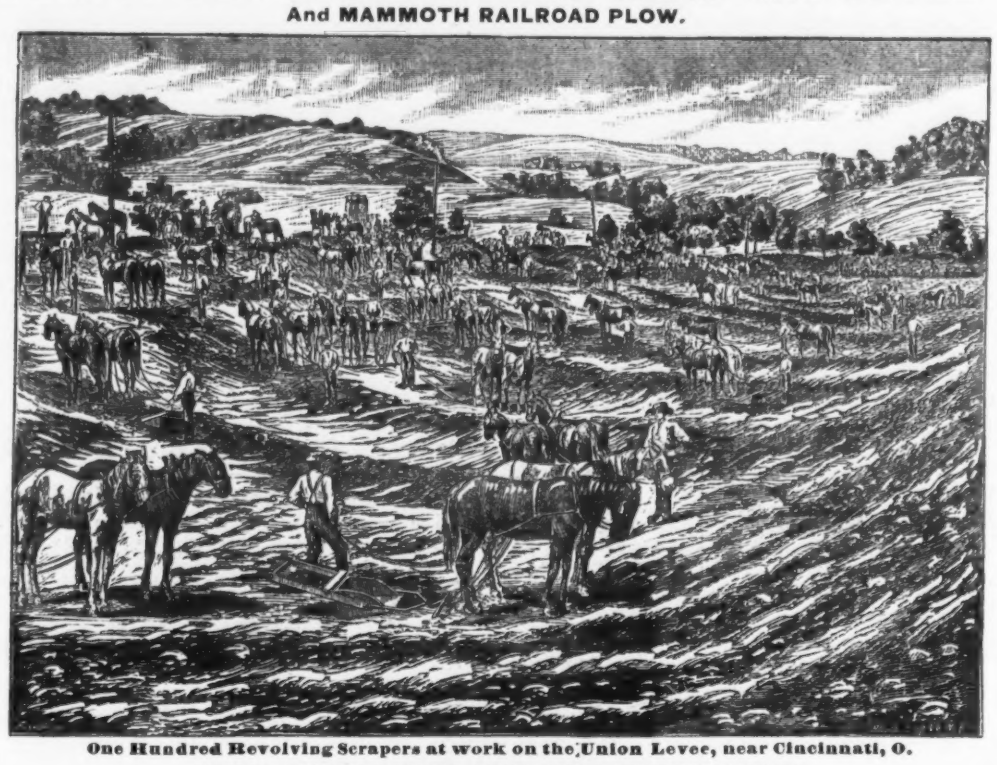

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Some Definitions of Steel.

(Continued).

We now turn to that method of manufacture in which iron is obtained from the ore directly without previously being obtained in a liquid state. We might speak of the Chenot and the puddling processes separately, but these two methods of treatment have so great a similarity in the final working of the mass that we will confine ourselves to the consideration of the products of the puddling process.

It is known that when cast iron is melted on the hearth of a puddling furnace and its foreign constituents oxidized, metallic iron separates in little grains which weld together and form a bloom. The iron will retain a larger or smaller quantity of carbon, according to the method of working, up to 0·6 per cent. What name shall we give to these different products? According to the old definition we must distinguish them as steel and iron; according to Greiner's definition they all come under the category of *iron*.

Let us try which of these methods of viewing it best corresponds to the requirements of practice. Puddled iron has been divided into three great classes according to the amount of carbon in it.

a. Granular, fibrous iron.
b. Fine grained.
c. Iron that resembles steel (puddle steel).

The iron that belongs to each category can again be divided, according to the amount of sulphur and phosphorus in it. We shall introduce below the typical composition of the different sorts of iron produced in Belgium. We leave out of consideration for the present the amount of silicon and manganese. The silicon stands between 0·05 and 0·40 per cent., according to the amount of slag left in the iron, while the manganese mostly falls below 0·50 per cent. We shall find in the following examples that the quantity of silicon does not exceed 0·15 per cent.:

a. Granular and Fibrous Iron.

	Granular iron.	Fibrous Iron.				
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Sulphur..	0·08 %	0·065	0·05	0·085	0·02	Trace.
Phosphor.	0·60 %	0·500	0·40	0·300	0·20	0·10

The quantity of carbon is below 0·10 per cent.

b. Fine Grained Iron.

Sulphur.....Trace to 0·025 per cent.
Phosphorus.....0·10 " 0·25 "
Carbon.....0·10 " 0·50 "

c. Steel like Iron (Puddled Steel).

Sulphur.....trace.
Phosphorus.....0·05
Carbon.....0·50

We will only remark that the amount of carbon in fine grained iron is high enough to designate this product as steel.

Finally we know that iron No. 1 with very little carbon in it is suitable for hardening. For what reason then is it not called *steel?*

We must add that furnacemen give the name of puddled steel only to products obtained from crude iron, which is free from phosphorus, and, in fact, when we compare the fracture of puddled steel and fine grain iron, we see that the grain of the latter is much coarser, more brilliant and darker than that of the former. Hence it is always difficult to draw a sharp line of division between the two products, and they are actually often interchanged in sorting Belgian irons.

We will now compare the products obtained by the puddling process with those of the Bessemer and Martin's processes. In the two latter we compare:

1. Texture.
2. Density.
3. Strength.

1. If two forged rods of the same size are taken, it will be noticed that the rod of Bessemer or Martin steel exhibits a much finer, denser and duller grain than a rod of puddled steel containing an equal quantity of carbon. The same difference can also be observed if the two rods are compared when hardened. The texture of the puddled steel will have more resemblance to a cast steel of much lower carburation.

2. The density of cast steel is much greater than that of puddled iron. The liquid condition in which Bessemer and Martin metal is obtained also permits a much more complete separation of the slag. This is not the case with puddled iron, which always contains a certain amount of slag. It is true that a relatively very pure puddled steel can be produced, if it is repeatedly reheated and worked under the hammer, but the mechanical work of tilting can no longer be done at the iron furnace.

We have subjected the same cast iron to both the puddling and the Bessemer processes.

In puddling we have worked on fibrous and on puddled steel. The puddled bloom was worked under a hammer; and after reheating it was forged into the form of a pig 3 to 4 inches square. The latter, after the next heating, was drawn out to a bar 2 inches square. Finally, this bar was again heated and forged down to an inch square (25 centimeters), to bring it to the form used in our experiments.

The following table shows the composition of these different products, according to the analyses of Moreland, engineer of the John Cockrill Company:

	Gray cast iron employed.	Bessemer Steel Ingot.	Fibrous Puddled Iron.	Puddled Steel. Finished product.
Silicon	2·50	0·15	0·35	0·05
Sulphur	0·04	0·04	0·015	0·01
Phosphorus	0·09	0·10	0·14	0·10
Carbon	4·25	0·40	0·12	0·45
Manganese	3·75	0·75	0·90	0·25
Iron	89·50	98·50	98·50	99·00

	Slag and Materials Used.		
	Slag from Bessemer Converter.	Slag from Puddling Furnace.	Material used for sides of the Furnace.
Water and carbonic acid..	.....	.....	10·00
Silicic acid	51·50	14·00	9·00
Alumina	5·00	5·00	4·00
Lime	0·50	2·50	5·00
Magnesia	trace	0·50	2·00
Iron and protoxide iron	8·25	49·00	7·00
Sesqui-oxide of iron	1·50	19·00	60·00
Protoxide manganese	32·50	4·85	1·00
Sulphur	0·015	0·30	0·20
Phosphoric acid	trace	4·25	0·25

The greater part of the sulphur and phosphorus in the slag comes from the side walls of the furnace. From the foregoing we may conclude that the presence of a certain quantity of slag in puddled iron causes an increase of the amount of sulphur and phosphorus in the metal. The above mentioned fibrous iron, with its 5 per cent. of slag, has more phosphorus than puddled steel made from the same cast iron. When we bring the metal to a liquid state, we prevent the slag from remaining in it, and we bring the individual molecules of the metal much closer together, whereby its density is at the same time considerably increased. This also explains why the specific gravity of cast steel is found as high even as 8·2, while that of puddled iron is never greater than 7·9. This difference corresponds to 5 per cent. of open spaces between the molecules of the iron.

3. The much greater purity of the metal and the intimate contact of the molecules must naturally impart much greater strength to cast steel than we would find in a puddled steel of the same chemical composition.

We will demonstrate this by the following experiments. First we introduce the experiments on the strength of iron and steel made by the John Cockerill Company:

1. *Granular and Fibrous Iron.*—Uses: Granular iron for rails; fibrous iron for weapons, nails, sheet iron, etc. Contains less than 0·10 per cent. of carbon. These kinds of iron cannot be hardened, but will weld.

	Granular iron containing phosphorus.	No. 1 with 60 % granular iron.	No. 2 with 40 % granular iron.	No. 3 with 30 % granular iron	No. 4 pure fibrous iron.	No. 5 fine grained.
Absolute strength per square millimeter*	less than 30 kilos	30 to 32·5	32·5 to 35	35 to 37·5	37·5 to 40	over 40 kilos
Expansion after breaking	slight	less than 5 %	5 to 7 %	7·5 to 10 %	10 to 12·5 %	12·5 to 15 %

(The data are the average results.)

* Thirty kilos per square millimeter is equivalent to 42,580⅘ pounds per square inch. The relative proportions being the chief point, we leave the figures as in the original. [Ed.]

These kinds of iron cannot be tempered, but may be welded.

2. *Fine Grained Iron.*—Uses: Rails, cannon rings, wire, cables, axles, wrought pieces. Carbon, 0·10 to 0·50 per cent. Absolute strength, 40 to 45 kilos. Expansion, or stretching on breaking, 10 per cent. May be hardened a little and welded.

3. *Steel-like Iron.*—Uses: Rails, tools saws, cables, &c. Carbon, 0·40 to 0·60 per cent. Absolute strength, 45 to 50 kilos. Expansion, 10 per cent. May be tempered, but welds with difficulty.

4. *Cast Bessemer Steel.*—

a. Extra soft steel. Uses: Arms, cannons, fine sheet iron, boiler plates, rivets, etc. Carbon, below 0·25 to 0·35 per cent. Absolute strength, 48 to 56 kilos. Expansion, 20 to 25 per cent. Cannot be hardened, but welds.

b. Soft steel. Uses: Different machine steel, axles, rails, &c. Carbon, 0·35 to 0·45 per cent.

c. Half hard, half soft steel. Uses: Rails, bands, pump cylinders, sliding pieces, etc. Carbon, 0·45 to 0·55 per cent. Absolute strength, 56 to 69 kilos. Expansion, 10 to 20 per cent. Can be tempered and welded a little.

d. Hard steel. Uses: Various kinds of springs, cutting tools, files, saws, stove augers. Carbon, 0·55 to 0·65 per cent.

e. Very hard steel. Uses: Fine springs, various fine tools, bobbins, etc. Carbon, 0·65 and more. Absolute strength, 69 to 105 kilos. Expansion, 5 to 10 per cent. It can be tempered but not welded.

If we compare these different products with regard to their absolute strength, we will notice that fine grained and puddled steel differ from fibrous iron much less than Bessemer steel with the same amount of carbon.

The following experiments will substantiate this assertion. We subjected rods of Bessemer steel and puddled steel, such as we have already given the composition of, to tests of strength. The rods were cylindrical, turned to 15 millimeters (about half inch) in diameter, for a length of 100 millimeters (4 inches).

A. Bessemer Steel.

	Limit of Elasticity.	Resulting Break.	Expansion or stretch on breaking.
	Kilos	Kilos	Per ct
1. Sample, 0·35 per cent. carbon.	34·	63·9	9·2
2. Sample, 0·45 per cent. carbon.	45·9	77·4	14·5
The mean of these	40·2	70·5	12·4

B.—Puddled Steel.

We subjected pieces made from the same bloom to the different tests. After the bloom was squeezed under the hammer it was again heated and hammered out to a pig of three or four inches square. After another heating and working under the hammer the pig was drawn out to a bar two inches square. This was cut in two pieces, one piece was hammered down to an inch square and the other piece rolled to the same size. The samples were then taken from these rods. The forged rod showed here and there unwelded spots; we have selected our samples in such a way as to show the influence of these imperfectly welded portions.

1. *The Wrought Rod.* (*With 0·45 per cent carbon.*)

	Limit of Elasticity.	Resulting Break.	Expansion on breaking	Remarks.
1 sample	20·0 kilo	35·4 kils	0·8 %	Very badly welded
2 sample	23·0 "	46·0 "	10·0 %	Quite well welded.
3 sample	20·0 "	51·2 "	13·3 %	" " "
4 sample	25·0 "	58·1 "	9·0 %	Perfectly welded..
Aver age of the 3 last samples.....	22·5 "	51·8 "	10·8 %	

2. *The Rolled Rod.* (*With 45 per cent. carbon.*)

	Limit of Elasticity.	Resulting Break.	Expansion on breaking	Remarks.
1 sample	24·7 kils	43·0 kilo	5·5 %	Exhibited one line not welded.
2 sample	25·5 "	45·9 "	4·5 %	
3 sample	28·0 "	45·9 "	5·5 %	
Aver age	26·0 "	44·9 "	4·8 %	

Collecting together what we have said, we have the following table:

	Absolute strength.	Expansion on breaking
Fibrous iron (see No. 5 above.)	40 kilo	15. %
Steel-like iron, for puddled steel.	48 "	7·5 %
Mean of above experiments).....		
Bessemer Steel.....	70 "	12·5 %

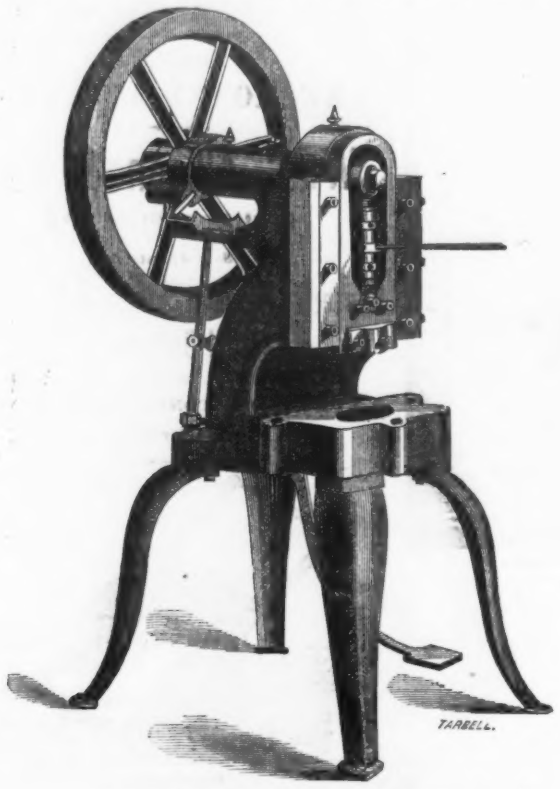
From this we conclude that, if the chemical composition is the same, puddled steel approaches much nearer to fibrous or sinewy iron than Bessemer steel does. This difference, however, arises chiefly from the fact that it is difficult in puddled iron or steel to find in all parts a perfect welding. Hence I departed farther from my subject to speak of the slags. Our experiments with wrought rods of puddled steel prove what an influence imperfectly welded spots can have on the absolute strength of the material. This evil is not to be dreaded when the metal has been fused, as fusion permits a direct contact of the individual particles of the metal.

Finally, we agree with Greiner that only those products should be classed as steel which obtain their great strength from the mode of manufacture, and, indeed, from the fluid state.

What is designated by the term puddled steel could be perfectly well classed with the fine grained and steel-like iron, because the adjective "steel-like" in this case, shall only indicate that the metal is capable of being hardened like certain kinds of cast steel.

Merriman's Patent Power Presses.

The press of which we present an illustration herewith has many features worthy of notice. The first of these is the new principle for the adjustment. This consists of the use of right and left hand screws and clamp nuts for regulating the length of the connecting rod. Fig. 1 shows the upper end of the rod, Fig. 5 the bottom, on which the knuckle joint makes connection with the slide. These are connected by the sleeve, Fig. 3, into which they screw. This sleeve is furnished with a right and left hand thread, both on the outside and inside; it is slit into four sections at the ends, and the outside is made tapering. On the outside of this sleeve are two binding nuts, shown in Figs. 2 and 4. These nuts, when screwed up, clamp the sleeve firmly upon the parts of the connecting rod and prevent the possibility of any play from wear or any other cause. To adjust the punch it is only necessary to enter the actuating bar into the holes (as shown in the cut) in the center of the sleeve and turn it either



MERRIMAN'S PATENT POWER PUNCHING PRESS.

way, as may be required, and any degree of accuracy is attainable with great ease; the clamp nuts are screwed home, and the connecting rod is as secure as though it was of a single piece. The connecting rod is made long, so that there may be as little strain as possible from its working at an angle, and so wearing guides and straining the machine. In setting the dies there is no need of throwing off the belt or stopping the balance wheel. A pin in the back of the clutch is so arranged as to render the clutch inoperative, so that there may be no danger whatever in setting the dies. A wrench is provided, and by applying it to the nut on the front end of the shaft the slide and punch can be moved up and down. The lower end of the pitman or connecting rod is hinged

Fig. 1. *Fig.* 2. *Fig.* 3. *Fig.* 4. *Fig.* 5.

immediately over the punch shank, and when at work is in nearly a direct line with the motion. The gate or slide is very long, enclosing the crank, and thus giving a very long bearing and grinding with very little friction. The clutch by which this press is run is worthy of especial note. It is so arranged that the press may be set facing either end of a line of shafting and yet run with an open belt, the direction in which the balance wheel runs not making any difference in the operation of the press. This avoiding of crossed belts is a great advantage. By placing the foot upon the treadle the crank or pitman may be brought from any position to the upper center. It is not necessary to hold the foot upon the treadle until the press makes a stroke; all that is necessary is to press down the treadle and allow it to return, and at the proper moment the press makes its stroke and then stops on the upper center.

The arrangement of the balance wheel bearing, and the sleeve in which the shaft runs, is such that dirt and dust are excluded, and the parts have both ample bearing surface and good lubrication.

These presses are of great power, and run with from 100, for a No. 2 press, to 125 revolutions per minute for a No. 4 press. The latter press can cut a 4 inch circle from iron one-eighth thick, or a 3 inch circle from three-sixteenths iron. These are flat punches. The size of opening in the bed of a No. 4 press is six inches by ten. A. H. Merriman, West Meriden, Conn., is the inventor and patentee of this press.

Uncomfortable Workshops.

A writer in the *Manufacturer and Builder* offers the following sensible advice to manufacturers employing labor:

With some rare exceptions, workshops are not built for the comfort of the operatives; most of them have inadequate provisions for heating in winter, and many, also, have defective ventilation, which is even worse in winter than in summer. Most shops cannot be kept at an equal, comfortable temperature, and thus the workmen suffer, especially from cold; while the fact is that if they were primitively well constructed the same amount, or even less, fuel would keep them sufficiently warm in cold weather, and judicious ventilation would promote the general health of all in the shop, as well in the summer as in the winter.

We maintain that if the owner of any industrial establishment understands his own interest, he will do a great deal for the comfort of his employes, as an operative, when working in tolerably comfortable surroundings, will do more and better work than when he suffers from heat or cold, or what is worse than all in the long run, an impure atmosphere. All practical men know the utter discomfort of working on a hot day in an illy ventilated place, even the impossibility of doing much labor or turning out a quantity of work at all in keeping with their capacity at other times. They also know the influence of icy feet and frosty tools cold to the touch, benumbing the fingers and hands which use them, and thus causing the production of a kind of work far inferior to what they could otherwise do. This is the first effect; the next effect is, he suffers, gets a cold, does less work, and finally becomes sick, when all work ceases.

Very few people are aware that more than half the diseases of the laboring classes proceed from exposure to cold. We must not forget that in our climate we have only three summer months; that at least for four months artificial heat is absolutely necessary, while the remaining five spring and fall months are so uncertain that careful precaution is required, especially in dress, to avoid being caught by sudden changes in temperature, and thus pay for the least imprudence by coughs, catarrahs, bronchitis, indigestion, rheumatic attacks, diarrhœas, etc. There are, indeed, few persons of such perfect constitution that will not from time to time suffer by taking cold in some form or other, and careful observation and inquiry has convinced us that in the great majority of cases the cold has not exerted its baneful influence in the open air, but when in the house or shop where the body was exposed for a long time to a temperature so low as to cause the animal heat to descend below the normal temperature; then the check upon the otherwise always active perspiration causes substances to remain in the system which should be continually eliminated; the blood becomes, in this way, as it were, poisoned with undesirable material, and the results are various, according to the constitution of the individual; the weakest parts will then suffer, either the throat, head, lungs, joints, muscles, stomach, intestines, etc.; hence the various results which the same exposure to cold will have on different persons.

An employer who thus exposes his employes to causes of disarranged health by the defectiveness of his workshop, not only commits an offense against man, but he causes losses in his own behalf which he could prevent. The expense of having things of this kind arranged in the right way is, indeed, so small when compared with the results to be attained, that even aside from humanitarian principles (which makes it a duty), it is surprising to see so much neglect in this respect, and that even in quarters where it should be least expected.

Special Notices.

MANUFACTURERS OF HEAVY AND SHELF Hardware or House Furnishing Goods, desiring to have the sale of their productions pushed in the city of New York and vicinity, will learn of an opportunity by communicating with

BOX 14,
Office of *The Iron Age*, 10 Warren St., N. Y.

TO LET—THE WORKS OF THE

CHICAGO

Plate and Bar Mill Co.,

INCLUDING

GALVANIZING WORKS,

the whole complete and ready for operation. Only works in the State, or west of Cleveland, making Boiler Plate, Sheet and Galvanized Metals. Large trade established. Address

J. M. AYER,
Care *J. V. Ayer & Sons, Chicago, Ill.*

Special Notices.

Wanted,

A Hardware Salesman

to travel in New England.

Address, with references,
P. O. Box 2678, Boston, Mass.

LORD WELLINGTON was one of the four engines of similar design, which were manufactured in 1812 and 1813, at Leeds, England, and claimed to be the first commercially successful locomotive used on any railway, running for many years from the Middleton Collieries to Leeds, drawing thirty coal wagons, at a speed of 3¼ miles per hour. A Stereoscopic Picture of this Locomotive will be sent, post paid, on receipt of 25 cents.

Published by **L. L. Whitlock,**
Correspondent and Agent of The Iron Age,
P. O. Box 228, New York.

Office of HOTCHKISS' SONS.

BRIDGEPORT, CT., Feb. 16, 1876.

NOTICE TO THE HARDWARE TRADE.

The Lawrence Curry Comb Co., of New York city, having declared themselves the sole owners of the right to manufacture a Curry Comb having a projecting side handle supplemented by, or in combination with, any device which affords additional grasping facilities or support for the hand over the back of the comb," we take this method of saying, **and you are hereby specially notified,** that the so called "Perfect Comb" manufactured by the said Lawrence Curry Comb Co. is a direct infringement on a patent owned by us, granted Dec. 27th, 1864, and all parties manufacturing or selling Curry Combs of above make render themselves liable to us for damages, as we own the exclusive right to make and sell a Curry Comb **provided with a grasping device or handle above its back,** consisting of raised bars or braces rigidly secured to the Comb. Truly, yours,

HOTCHKISS' SONS.

IMPORTANT ANNOUNCEMENT

To Hardware Maunfacturers and the Trade.

BISSELL, WELLES & MILLET,

will hold their

First Spring Trade Sale for 1876,

At their store, *No. 13 Murray street,* at 10½ o'clock, a. m., on Tuesday and Wednesday, February 29th and March 1st, of

Heavy and Shelf Hardware, Cutlery, Guns, House Furnishing Goods, Etc., Etc.,

Comprising a full line of assorted Hardware, Files, Locks, Mechanics' Tools, Builders' Hardware, Shovels, Cutlery, etc., etc., direct from the manufacturers, and in quantities to suit large and small buyers. The manufacturers are requested to forward us their invoices and goods for this sale if possible on or before the 25th inst., to enable us to properly classify and arrange the goods. Buyers can rest assured that all goods sold by us are fairly sampled and catalogued, and no sale if not as represented.

BISSELL, WELLES & MILLET,
Auctioneers.

Partner Wanted,

In large Iron Property. Charcoal Furnace and Forge Works leased for $12,000 per annum, quarterly payments. Room for other works. Make best quality metal. Address

P. O. Box 863, Baltimore, Md.

To Manufacturers and Patentees.

Wanted useful patented articles for manufacture, suitable for sale by hardware dealers. Cash will be paid for patents or advance made for royalty.

Address, **P. P. PRATT,**
Care **PRATT & CO., Buffalo, N. Y.**

Wanted.

A superintendent for Puddling Mill; one who thoroughly understands Bailing with Draft Furnaces. Best of reference required from former employer.

Address, **A. R.,**
Office of *The Iron Age*, 220 S. 4th St., Philadelphia.

Business Opportunities.

New Capital Procured, Partnerships Arranged, and Commercial, Mining and Banking Corporations Organized, by

CLARKE, CHITTY & CLARKE,
Board of Trade Offices, New York.
P. O. BOX, 4071.

NOTICE! POND'S TOOLS.

The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of MACHINIST'S TOOLS as conducted by Mr. Lucius W. Pond since 1847, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of DAVID W. POND, Successor to Lucius W. Pond.

CARD.—Having assumed the business mentioned above, I solicit Inquiry and Patronage, with guarantee that present standard of Workmanship, and quality of Machinery shall be maintained. A large quantity of NEW AND SECOND-HAND TOOLS, ALL STYLES AND SIZES, For Sale at Low Prices. Send for list of second-hand tools. Store at 98 Liberty St., New York, will be discontinued from Feb. 1, 1876, and all sales made from manufactory.

Respectfully, **DAVID W. POND,**
Successor to LUCIUS W. POND.

DISSOLUTION OF COPARTNERSHIP

The firm of McClernan & Hymes is this day dissolved by mutual consent. The business of the firm will be liquidated by M. McClernan alone, No. 130 Liberty Street.

NEW YORK, Jan. 20, 1876. M. McCLERNAN, D. HYMES.

HARDWARE SPECIALTIES

Manufactured to order on favorable terms.

POWER AND ROOM to Rent by the

CORRUGATED METAL CO, East Berlin, Ct.

Special Notices.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **There is a special claim on each of the Dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

WANTED TO PURCHASE,

100 tons good Second-Hand T Rails, 18 or 20 lbs. per yard.

Address, giving particulars,
PIPER & THOMPSON,
Lapeer, Mich.

TO LET,

A Light, Handsome Office.

Possession Immediately.

HERMANN BOKER & CO.,
101 Duane Street, N. Y.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at ***99 Cannon Street, London, E. C.***

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

HALL & HARBESON,

Manufacturers of

Chemical & Physical Instruments,

191 Greenwich Street, N. Y.

SPECIALTY.—BUNSEN'S GAS BURNERS, for all heating purposes; BUNSEN'S IMPROVED GAS COMBUSTION FURNACES, with 10, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to

CHESTER STEEL CASTINGS CO.,
Evelina St., Philadelphia, Pa.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address *CAR WHEEL FOUNDRY,*
P. O Box 134, Selma, Alabama.

Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE,

No. 258 Broadway, New York.
A. V. BRIESEN.

A. PURVES & SON,

Corner South & Penn Streets, Phila.,

Dealers in

Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.

Cash paid for all kinds of **Metals** and **Tools.**

Mortgage Sale of Charcoal Furnaces, also 1700 tons of charcoal pig metal, good car wheel and Bessemer pig iron, according to grades (1, 2, 3, 4, 5) to be sold at auction, March 7th, 1876, 10 o'clock, a. m., on premises, at Port Leydon, Lewis Co., New York. The property consists of 2 stacks, 9 feet bosh, one in complete working order; will make 10 tons *each* per day. Water power (about 800 horse), 18 acres in furnace lot in fee (on which are furnaces, tank and machinery houses, coal sheds, office building, large boarding house for laborers, and four other houses for families; also large mine of magnetic ore on same plot); also, 1000 acres of wood land in fee, hardwood on 20,000 acres adjoining land, 50 cents an acre royalty. Charcoal iron can be made at these furnaces now for $25 or less a ton. Large quantities of iron made by these furnaces have been sold to and used by leading car wheel and other manufactories with perfect satisfaction. Your attention is particularly called to the sale of both furnaces, pig iron and materials, 28,000 bushels of charcoal, tools, etc. The furnace could be put in blast in 30 days. The Utica and Black River Railroad and Black River Canal pass within a few hundred yards of the furnace. The iron will be sold in lots to suit purchasers.

T. H. WAGSTAFF,
Sec'y of Black River Iron and Mining Co.,
61 Broadway, N. Y., Room 53.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO, Proprietors,
101 & 103 Duane St., N. Y.

WANTED.—Situation as salesman in a manufactory of Hardware of any description. Twelve years' experience traveling in the West.

Address **W. C. THAYER,**
Wood's Hotel,
116 & 118 Fifth Ave., Chicago, Ill.

DISCOUNT LISTS.

Hinges { Stanley Works' 1st...10 % to 50 % each, 75c.
and Butts. { Union Mfg Co.'s.....10 % to 60 % " 75c.

Bolt, File and Hinge and Butt List.—Contains all the lists and discounts that are used.....Price $1 00

Dayton & Lamberson, 97 Chambers St., N. Y.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,

IRON AND STEEL,
Care of *P. O. Box 813, Bridgeport, Conn.*

Worcester Free Institute.

APPRENTICE CLASS,

Enter January 29. Address,

Prof. C. O. THOMPSON,
Worcester, Mass.

Wanted,

by a young man, thoroughly acquainted with the *General* Hardware business, also *Builders'* Hardware, a situation as salesman or stock clerk. Has had 13 years' experience and can give the best of references as to ability, character, etc. Will locate at any point offering him a business opportunity. Address, **THEO. F. CLARK,**
P. O. Box 530, Po'keepsie, N. Y.

Special Notices.

An Experienced Traveler

with a good connection in the N. E. States and Canada, desires an immediate engagement to represent a first-class house in the hardware trade.

Address, **TRAVELER,**
P. O., Everett, Mass.

For Sale.

FOR SALE.
Valuable Iron Property.

The Rolling Mill, Nail Factory, Blast Furnace, Ores, Lands, &c., of the Hollidaysburg, and Gap Iron Works, formerly known as the Juniata Iron Co., at Hollidaysburg, Blair County, Pa., are offered for sale separately or as a whole. Terms easy.

If not sold or otherwise disposed of prior, the entire property will be offered at Public Sale at the American House, in Hollidaysburg, *Wednesday, March 15, 1876, 11 o'clock A. M.*

No more desirable property in the market. For further information, address,

A. K. BELL, President,
Hollidaysburg, Pa.

FEBRUARY 7, 1876.

AT FURNACE SITE,

☞ **On the 23d Mar. 1876, at 12 o'clock, Noon.**

FOR SALE at Public Auction

The Napanock Blast Furnace Property.

Description of the furnace is about as follows: Hight of stack 46 feet high, and 12 feet bosh, built of stone to top of bosh, thence up of brick banded with heavy iron; lining is of fire brick 20 inches thick. Hearth and boen are of fire brick. Tunnel head is 6 feet diameter. Hot blast was erected by Mr. McHose, of Reading, Pa.; is first-class, almost new. The power is of water, said to be of double the capacity; one of the best water powers in the State. Wheel is overshot, 26 feet diameter 6½ feet face. Capacity of furnace 20 tons Anthracite iron or 15 tons of charcoal iron. Woodland is abundant, from $3 to $6 per acre, for many years. Ores by railroad or by Delaware and Hudson Canal, which passes Napanock, which is a thriving place, two miles from Ellenville, Ulster Co., New York.

For further particulars, apply at furnace or of

H. BANGE,
94 Gold Street, New York City.

FOR SALE.

TESTING MACHINE, built by the South Boston Iron Co., arranged for tensile and compressive strains, capacity 150 tons.
MILLING MACHINE, built by Brainard Milling Machine Co., cutters swing 28 inches diameter, and spindle set at right angles, which insures accurate work
IRON ROOF, that covered New England Iron Co.'s Mill, 8 arches 80 feet span, posts 18 feet high, building now 80 feet wide by 90 feet long.
ROLLING TABLE, for straightening Iron.
PUDDLE TRAIN, for Billets and 3, 4 and 6 inch Bars.
FIVE DRILLS.
CORRUGATING MACHINE, Complete.
CORRUGATED SHEET IRON and barbed Nails.
SMALL UPRIGHT ENGINE, 15 H. P., inch cylinder.
PUMPS, Etc.

Apply to **WM. E. COFFIN & CO.,**
8 Oliver Street, Boston.

HARDWARE BUSINESS
For Sale.

In the city of Norwich, Conn., an old stand facing two streets. Rents low. Good help and doing a prosperous business. Large back country. The best of reasons given for selling. Address,

FULLER & PARISH, Norwich, Conn.

For Sale,

Stove and Tin Business.

Will sell, on good terms, one of the best arranged House Furnishing Stores in Canada West, at St. Thomas. The premises are roomy, the buildings having been arranged especially for this trade, with Tinsmith's workshops and benches complete for 12 men.

Present Stock about $6000.

St. Thomas is the head quarters of the Canadian Southern Railway Co. To a practical, energetic man this offers unusual advantages. Business well established and with good connection. Reason for disposal, present proprietors increasing their wholesale and retail Hardware Store next door to the above premises. Address

HORSMAN & HORSMAN,
Iron and Hardware Merchants,
St. Thomas, Canada West.

FOR SALE.

At Lowest Manufacturers' Rates,

GUNS & SHEET ZINC,

Best German and Belgian Brands,

By *LOUIS WINDMULLER & ROELKER,*
90 Reade Street, N. Y.

FOR SALE.

An ¾ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.

Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

FOR SALE,

at 10c. a copy, Weekly Spanish Review and Prices Current. The undersigned is also a *Translator* from and into the English, Spanish, French and German. *Latest Translations made:* for the governments of Germany and Spain, Pacific Mail S. S. Co., Walter A. Wood; Morris, Wheeler & Co.; Todd & Rafferty; John T. Dunkin; Fisk & Hatch; R. W. Wilde; Wilson Sewing Machine Co.; J. Hess & Co.; H. Marquardt; M. Echeverria & Co., and Chas. E. Little, New York; Hocking Valley Mfg. Co.; W. P. Potts, Son & Co., Phila.; Atlantic and Pacific Land Co.; B. E. Flemming, Jersey City; Wilder & Co., Savannah, and the Tanite Co.; Stroudsburg ("Emery Grinder"), to whom he refers.

☞ **Estimates furnished of translations and setting up of Spanish, German and French Catalogues for the Centennial.**

C. KIRCHHOFF,
Metal Reporter of "The Iron Age,"
Box 3091, New York P. O.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Feb. 16, 1876.

During the past week there has been a strong and well sustained upward movement in Wall street, and the prices of nearly all classes of securities have advanced. The money market, which usually feels the effects of increased speculative activity in the street, has somewhat unexpectedly weakened, and rates have declined. Borrowers on call have been freely accommodated at 3 @ 3½ per cent. Prime mercantile paper is quoted at 4½ @ 6 per cent., but buyers scrutinize closely, and there is no competition for paper concerning which there is a shadow of uncertainty.

In the gold market there has been a moderate advance in the premium, carrying it to a point at which it fluctuated between 112¾ and 113⅝. The following table shows the daily range of the premium since our last report:

	Highest.	Lowest.
Thursday	112⅞	112⅝
Friday	113	112⅞
Saturday	113⅛	113
Monday	113⅛	113⅛
Tuesday	113⅛	113⅛
Wednesday	113¼	113⅛

Government bonds continue strong on a steady demand for investment from financial institutions and private capitalists. There is a large demand from New England for registered issues, the recent bank robberies having made cautious investors afraid of any form of convertible securities. State bonds are strong, and there is an active call for desirable railway mortages, especially for those of the Pacific and Wisconsin roads.

The call issued by the Treasury on the 15th of November last for $12,785,350 coupon and registered bonds, matured last Tuesday, and the syndicate completed on that day the settlement for the new 5s. The *Evening Post*, of yesterday, says:

Less than $5,000,000 of new Fives remained to be settled for to-day, more than $7,000,000 having already been paid for either in called bonds, matured coupons or gold. Of the amount to be paid for to-day the syndicate had bonds and coupons to turn in for the larger part, so that a comparatively small amount ($2,600,600) of gold was paid into the Treasury. The called bonds which the syndicate have not been able to obtain will of course be presented in time to the Treasury, and gold be paid out therefrom for them. The thirty-first call of the Treasury for $5,000,000 5·20s, also dated Nov. 15, 1875, matures to-day; this call is for the account of the Sinking Fund, and of course no bonds are issued in place of those called. As these called bonds are presented gold will be paid for them; their presentation will probably extend over weeks, at least such part of them as the syndicate have not got and turned in. The aim in this case, as in previous settlements, has undoubtedly been by both the Treasury and the syndicate to disturb the gold and exchange markets as little as possible, and from present appearances there will be no disturbance, nor no change of importance in the stock of gold in the market.

The stock market has been unusually strong and active, and many classes of shares lately neglected have attracted more attention. The principal dealings have been in Lake Shore, St. Paul, Northwest, Western Union, Pacific Mail, Erie, Ohio and Mississippi, New York Central and Express stocks. We give below the ruling prices of shares in the active list.

The following tables show the movements in foreign trade for the week:

IMPORTS.

For the week ended Feb. 12:

	1874.	1875.	1876.
Total for week	$8,871,703	$6,601,928	$5,210,518
Prev. reported	30,575,939	31,764,632	34,457,274
Since Jan 1	$42,446,942	$38,366,560	$39,667,792

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	64	$662
Brass goods	2	264
Chains and anchors	58	2,302
Cutlery	73	19,773
Guns	3	235
Hardware	28	2,274
Iron, pig, tons	200	3,663
Iron, cotton ties	382	1,348
Iron, other, tons	3	248
Lead, pigs	35	202
Metal goods	158	14,647
Nails	2	541
Needles	14	4,252
Old metal		634
Per. caps	3	526
Saddlery	4	428
Steel	761	9 927
Silverware	4	4,377
Tin, boxes	9,019	52,974
Tin, 898 slabs	33,730	5,967
Teazles	25	963
Wire	37	427

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended Feb. 15:

	1874.	1875.	1876.
Total for week	$4,345,950	$3,952,584	$3,440,295
Prev. reported	32,673,408	26,806,051	29,558,312
Since Jan. 1	$37,019,358	$30,758,6 5	$32,998,607

EXPORTS OF SPECIE.

For the week ended Feb. 12:

Total for the week	$99,204
Previously reported	394,411
Total since Jan. 1, 1876	$493,615
Same time in 1875	158,191
Same time in 1874	855,631
Same time in 1873	147,242
Same time in 1872	252,525

Government bonds were active and strong up to the close, when the quotations were as follows:

	Bid.	Asked.
U. S. Currency 6s	125¼	126¼
U. S. 6s 1881, reg	123½	123⅞
U. S. 6s. 1881, cou	123¾	123¾
U. S. 5-20 1865, reg	118½	118⅝
U. S. 5-20 1865, cou	118⅝	118⅝
U. S. 5-20 1865, new reg	120	120¼
U. S. 5-20 1865, cou	119¾	120⅛
U. S. 5-20 1867, reg	122⅝	122⅝
U. S. 5-20 1867, cou	122⅞	123⅛
U. S. 5-20 1868, reg	123¾	124
U. S. 5-20 1868, cou	123⅞	124
U. S. 10-40 reg	117⅞	118¼
U. S. 10-40 cou	120⅜	121⅛
U. S. 5s, 1881, reg	118¾	118⅞
U. S. 5s. 1881, cou	118¾	118⅞

The following are the closing quotations of active stocks:

	Bid.	Asked.
Atlantic & Pacific R. R. Preferred	5⅞	6
Atlantic and Pacific Telegraph	19⅛	20
Chicago & Northwestern	43⅝	43⅞
" " Pref	65⅛	65¾
Chicago, Rock Island and Pacific	110	110¼
Chic., Bur. & Quincy	120½	121¾
Col., Chic. & Ind. Cent	4⅞	5⅛
Clev., Col., Cin. & Ind's	55	56¾
Cleveland and Pittsburgh	93¼	93½
Chicago & Alton	105½	106
" " Pref	110	—
Consolidation Coal	47⅛	49
Canton	44	46
Del. Lack. and Western	117⅛	118
Delaware & Hudson Canal	122	123
Adams Express	109¼	111
American Express	63¾	64½
United States Express	74⅝	75½
Wells, Fargo & Co. Express	88	88½
Erie	17⅛	17½
Harlem	143	144½
Hannibal & St. Joseph	18½	18⅝
" " Pref	29	29¼
Illinois Central	99½	100
Kansas Pacific	13½	14½
Kansas & Texas	9	9¼
Lake Shore	65⅝	65¾
Michigan Central	60⅜	60½
Milwaukee & St. Paul	44⅛	44⅝
" Pref.	78⅛	78¾
Mariposa	8⅝	9
" Pref	9	10
N. Y., N. H. Hart	150½	150½
New York Central	115¾	116¼
New Jersey Central	107	108
Ohio & Mississippi	21⅝	21¾
Pacific Mail	33¾	33⅞
Panama	130½	135
Pittsburgh & Fort Wayne	101¾	102½
Pacific of Missouri	12¼	12⅝
Quicksilver	17	18
" Pref	24	25
St. L., Kan. City Northern	5½	6
" " Pref	29¼	30¼
Tol., Wabash & Western	5¾	5⅞
Union Pacific	68¾	69⅜
Western Union Telegraph	74	74⅛

GENERAL HARDWARE.

There is very little to report regarding this branch of trade. Prices continue firm, and few changes of any importance have transpired.

In Foreign Hardware we hear of some increase in activity and firm prices.

The Branford Lock Works have almost ready to issue a new illustrated catalogue of their goods. This book, which is uniform in size with the catalogue of the Hart, Bliven & Mead Mfg. Co., has 340 pages, is handsomely illustrated and well got up in every respect. It has been arranged with a special view to convenience of reference. The prices will be given in a separate condensed list. One copy of the book will be sent to each of their customers. To any party not a regular customer one copy will be sent on receipt of $4, which amount will be credited on their first bill amounting to $50.

The building for Russell & Erwin's new Wood Screw factory is completed, and they are almost ready to begin manufacturing there. The machinery is much of it ready, and has, in fact, been in use for some time in Hartford, where this company are at present manufacturing 1000 gross of Screws per day. It is expected that sufficient machinery will be in place in the factory by the 1st of March to turn out 2500 gross per day, and that the capacity will be increased by the 1st of July to 5000 gross per day.

On the opposite page will be seen a notice of Hotchkiss & Sons in relation to their Curry Comb patents, which will interest the trade.

The demand for Nails is fair, and quotations remain as before, viz.: 10d., $2·90, net. Orders for 200 kegs and over are easily placed at a shade under this figure.

H. Burden & Sons, Troy, N. Y., have issued a circular under date of 14th instant, in which they quote the present price of Horse Shoes at 4¼ cents per pound, and Mule Shoes 5¼ cents per pound, in lots of 100 kegs, f. o. b., at Troy. The price from store here is $4·37½ per keg for Horse Shoes and $5·37½ per keg for Mule Shoes. H. Burden & Sons have also issued the following regarding Burden's Swaged Horse Shoes:

BURDEN'S SWAGED HORSE SHOE.

We are now making a new Horse Shoe called "Burden's Swaged Horse Shoe," which possesses the following great advantages:

It is easily fitted, which saves coal and time.

It has a web of good width, and plenty of stock properly distributed throughout the different parts of the Shoe.

It has a fine crease of good depth.

The nail holes are punched clear through at proper angles, and are entirely free from burrs.

The outside edges of the Shoe are perfectly smooth; there are no bulges or projections of any kind.

The heel is of increased thickness.

The concave in the forward Shoe is uniform and well defined, leaving a good, even bearing for the wall of the hoof.

The Shoe is clean, smooth, well finished, and of a bright, bluish color. No imperfect Shoes will be found in our kegs.

These Swaged Shoes are superior in every particular to any Horse Shoes ever before offered. The high uniform quality of our iron is so well known and universally acknowledged, we do not deem it necessary to say anything on this point.

Each Shoe is warranted to bend double cold.

A full assortment of the Swaged Shoes will be carried in stock by our New York agents and by the Hardware trade generally.

H. BURDEN & SONS,
Burden Iron Works, Troy, N. Y.
February, 1876.

William H. Wallace & Co., sole agents, No. 131, Washington street, New York City.

We have received the following circular:

NEW YORK, Feb. 15, 1876.

The subscriber respectfully invites your attention to the following reduced prices:

	Horse.	Mule.
Burden's Shoes, per keg	$4·37½	$5·37½
Union H. S. Co's. per keg		4·75

Horse Nails,

Nos	5,	6,	7,	8,	9,	10,
Ausable Horse Nail Co's	30,	27,	25,	24,	23,	22 cts. per lb.
Ausable Pointed and Fin'd	31,	28,	26,	25,	24,	23 cts. per lb.
Canton	21,	19,	18,	17,	16	cts. per lb.

Net Cash. Subject to the changes of the market without notice.

Parties purchasing 1000 lbs. of these nails before July 1st, or January 1st, who do not sell below these rates, will then be credited with a discount of 5 per cent. from purchases of 1000 pounds; 7½ per cent. from purchases of 5000 pounds.

Burden's new Swaged Shoes combine various improvements, and so closely resemble the hand-made that they must meet increased favor with customers.

He continues to offer a full assortment of Screws, English or American, Philadelphia Pat. Carriage Bolts, Toe Calks, etc., at lowest rates.

GEORGE W. BRUCE, No. 1 Platt street.

Guy C. Hotchkiss, Field & Co., Brooklyn, E. D., have added to their specialties in Carriage Materials the manufacture of Wrought Iron Anvils and Vises, which they claim are fully equal in quality to Peter Wright's goods. They quote these Anvils 11c. per lb., and Vises 12½c. per lb., currency.

We invite the attention of manufacturers of Hardware and House Furnishing Goods to the advertisement on the opposite page, addressed to Box 14, this office. The advertiser, a young man well known among the trade here, is anxious to add some specialties to the line of goods which he represents.

We take the following regarding the Tucker Alarm Tills from an Indianapolis paper. These goods are illustrated in their advertisement on page 34:

A SUCCESSFUL ENTERPRIZE.

One of the most stirring industries in our midst, and one that is constantly increasing its business, is the Tucker Alarm Till Manufacturing Company. Mr. W. H. Tucker, the inventor of this simple, yet effective Alarm Till, has been engaged in the manufacturing and the sale of them since 1865, and has profited by his experience, making improvements as they suggested themselves, until to-day he has got the Alarm Till seemingly perfect. Skill and perseverance combined in the prosecution of his business has enabled him to overcome all obstacles and establish himself in such a manner that the Tucker Till has become known all over the country. In the year 1870 he formed a co-partnership with R. S. Dorsey, an experienced hardware merchant. Since that time the reputation of this useful invention has extended not only over the United States, but also to foreign countries, and by patenting all improvements made they have distanced all competitors in this line, and are to-day manufacturing double the number of Alarm Tills that are turned out by all the manufacturers of this class of goods combined. One of the members of the firm states that the hardware dealers throughout the country are ceasing to sell other Alarm Tills. So popular has the Tucker patent become that this has aroused the jealousy of competing manufacturers to such an extent that this company is obliged to defend suit after suit, where infringements on the Tucker Patent Alarm Till have been made. One of the best proofs of the popularity of this invention is the fact that in the month of January, 1876, the company received orders for over 100 dozen Tills. This overwhelming increase in the sale of this article is the best evidence that the Tucker is the best alarm money drawer, and in fact has no equal. The company have recently increased their facilities for manufacturing, which will enable them to furnish the trade more promptly, and even at a less cost than heretofore. It is really gratifying that this establishment has become so prosperous, as it is an invention of an Indianapolitan and is backed by Indianapolis capital. This company own or control all of the most useful or important improvements that have been made upon Alarm Tills within the last ten years, and it is worthy of note that merchants who have been induced to sell a cheaper or inferior Till have invariably found out their mistake, and are again selling none but the Tucker Alarm Till.

The Lester Oil Co.'s Synovial Oil is gaining in popularity as a lubricant. Among those who have become interested in the company may be named Gen. Lyman B. Frieze, of R. I.; Henry C. Lord, Esq., of Cincinnati; Hon. L. E. Chittenden, Mr. George F. Gray, and others of this city. It is understood that Messrs. Gray, Lord & Frieze are to assume the active management of the business, making New York their headquarters and devoting themselves exclusively to the service of the company.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Feb. 16, 1876.

Scotch Pig.—The demand continues falling off, and prices are, in consequence, weaker. The following are makers' quotations:

Gartsherrie No. 1	73/
Coltness No. 1	76/
Glengarnock No. 1	69/
Eglinton No. 1	63/

Manufactured Iron.—Best Staffordshire Bars are quoted £9. 15/.

Rails.—Welsh, £6.

IRON.

American Pig.—During the week business has been confined to the sale of small lots, without any sign of improvement. Indeed, the tone of the market is rather weaker, if anything. We hear of sales at our quotations amounting to about 1500 tons of all grades. Most sellers have been disappointed at the demand thus far this year, and many look for lower prices. We quote: No. 1 Foundry, $23; No. 2 Foundry, $21; Gray Forge, $20. These prices are for the best brands. Those in less favor are generally sold at a concession.

Scotch Pig.—The telegrams from the other side report a decline in Glasgow, but the stock here is small, and though the demand is at present almost nothing, the prices are as before quoted. In transactions there is nothing to report. We quote: Coltness, $32 @ $33; Glengarnock, $30 @ $31; Gartsherrie, $32·50; Eglinton, $29·50 @ $30.

Rails.—Until the price of Steel Rails advances buyers will probably continue to prefer them to Iron in most cases. Iron are still $42 @ $46 at mill, and Eastern Steel Rails are quoted $65 at tide water, and Western $60 at mill. There are a good many negotiations going on, but transactions have been small.

Old Rails.—We quote Old Rails $20.

Scrap.—Scrap here is scarce, but the demand is small; still we advance our quotation to $32. A sale is reported of 200 tons at $31·50.

METALS.

Copper.—This has been a dull week, sales of Lake Superior Copper not exceeding 200,000 pounds at 22½c. @ 22¾c., on the spot, the closing figure. Nothing has transpired in futures. Baltimore we quote 22¾c., nominally. The official telegram from London, dated Saturday last, quotes Chili Bars £79. 10/, and Best Selected £87. From this it will be perceived that the London market has declined steadily since the commencement of the year; in fact, all metals have given way in that market, notwithstanding the greater ease in money matters. This weakness in England, and to a less degree on the Continent, is due on the one hand to the absence of speculation, and on the other to the disinclination on the part of dealers and consumers to anticipate requirements. So many failures and forced realizations took place last year, that people in the metal trade over there are from all appearances determined to hold as light stocks as possible till they can form some judgment with respect to the spring trade. A favorable statistical position has lost much of its weight with them, since the cable can be resorted to any day, and sixty days later steam will place the fresh supply ordered on the London market all the way from Valparaiso. The *Mining Gazette*, of Houghton, Lake Superior, in drawing a comparison, in its last issue, between the production of that privileged region and England proper, produces some statistics of interest. Thus in 1865 the Lake Superior mines produced of Ingot Copper but 7000 tons, while in 1874 they turned out 17,327; on the other hand the Devon and Cornwall output in 1865 was 159,409 tons ore, while in 1874 it had sunk to 53,281. The *Gazette* adds: "Can anything show clearer than this that the English Copper mines cannot live with the prices that have ruled on an average the ten years in question, which was £78. 10/ for Chili Bars." The manufactures of Copper are firm in value as follows: New Sheathing, 30c.; Bolts and Braziers, 31c.; Nails, 38c. @ 39c.; Bronze and Yellow Metal Sheathing, 21c.; Yellow Metal Bolts, 28c.; and do. Nails, 21c., net cash.

Tin.—The heavy shipments made to England from Australia in January, amounting to 900 tons, against 950 in December, announced per cable last week, have had the effect of causing a precipitate decline in Tin in the London market, although people were prepared that the shipments referred to would be large, this being the season when the Tin is shipped more extensively than during the remainder of the year. On the other hand there scarcely reaches us a mail from Australia but contains news of some fresh discoveries, either on the mainland or in Tasmania, especially the latter. This, joined to the vigor which the Straits of Malacca display in Tin mining matters, constitutes an element forbidding, from all appearances, every thought of a lasting recovery in value, unless something accidental and unforeseen should turn up, not now perceptible. Straits Tin, which had just recovered to £81. 10/, immediately receded to £78. 10/, where it remains at present, with a steady but moderate demand. This is but £1 above the lowest point it broke to last year when the great London failures occurred. The Singapore cable dispatch quotes $22·50, against $22·75 last week. These accounts have not failed to spread a torpor in our own midst, the more so as unusually large quantities are about due both by steam and sail here and at Boston. We, therefore, quote, on a very dull market, Straits, 18¼c. @ 18⅜c., gold; English Refined, 18½c.; ditto Common, 18¼c.; and Banca, 23c., the latter nominally, all gold, for large lots. *Tin Plates.*—However well this article may be thought of, it remains a sore disappointment to the importer, inasmuch as it seems impossible to establish a price which will save him from loss at the present cost of importation, notwithstanding the fact that sales from the hands of dealers continue on quite a satisfactory scale. We quote, with a fair demand, gold, per box, large lots, ordinary brands: Charcoal Bright, $7·50; ditto Terne, $7; Coke Tin, $6·50 @ $6·75; and ditto Ternes, $6·12½ @ $6·25.

Lead.—The week under review has been an excessively dull one, sales being restricted to some 50 tons, in lots, at 6⅛c., gold, for Common Domestic, at which it closes, not lacking in firmness on account of the reduced supply under good control. Common Foreign we nominally quote 6⅞c. @ 7c., gold, there being none here. Soft Missouri is worth 7·58c., currency; ditto Select, 7·75c., currency. In England, as per last mail accounts, Lead was becoming slightly weaker, while on the Continent it remained better sustained. The manufactures of Lead are steady at the following rates: Bar, 8¾c.; Pipe, 9c.; and Sheet, 9¼c., less 10 per cent. to the trade.

Spelter and Zinc.—Domestic Spelter is gradually working itself into favor and an improved position, and but for the few outside lots still occasionally thwarting its upward course, even the enhanced combination price of 7¾c., currency, here, would be currently obtainable, at which some sales have been effected during the week, while some minor outside parcels have gone at 7·45c. @ 7·65c., currency. While in England the metal has given evidence of failing strength, it has been as firm as ever from sheer scarcity on the Continent. Here, 5 tons C. G. H. sold at 7·30c., gold, with none afloat. We quote Silesian 7·30c. @ 7·37½c., gold, at which figures there is no inducement to ship any this way. Under these circumstances we are wholly dependent on the domestic article. Sheet Zinc still quiet at 8¾c. @ 9c., gold.

Antimony.—In moderate parcels sales are effected to dealers at 14⅝c., gold. We quote the same for large lots 14¼c. @ 14½c., gold.

COAL.

The Coal market still continues unimproved, and we have nothing special of any importance to note. Anthracite is dull, and the trade is limited, both at wholesale and retail.

The quantity of Coal sent from the Schuylkill region for the past week was 61,454 tons, against 4717 tons for the same period of last year. Increase, 56,737 tons. The quantity for the year so far is 448,915 tons, against 401,210 tons for the corresponding period of last year. Increase, 47,705 tons.

The quantity sent from all the regions for the week was: Anthracite, 298,557 tons; Bituminous, 49,353 tons; total, 347,910 tons, against 138,460 tons Anthracite and 42,128 tons Bituminous; total, 180,588 tons for the same period of last year. Increase of Anthracite, 160,097 tons; increase of Bituminous, 7225 tons; total increase, 167,322 tons.

The quantity sent from all the regions for the year was: Anthracite, 1,933,365 tons; Bituminous, 264,654 tons; total, 2,208,019 tons, against 1,365,795 tons Anthracite and 215,454 tons Bituminous; total, 1,581,249 tons for the corresponding period of last year; increase of Anthracite, 567,570 tons; increase of Bituminous, 49,200 tons; total increase, 616,770 tons.

The following are the cargo prices of the different companies' Coal, delivered at the various shipping ports near New York during the month of February:

	L.	Str.	Gr.	Egg	Sto.	Cht
Lackawanna D. & H.	$ 4 65	4 65	4 75	4 95	5 50	4 70
Wilkesbarre	4 65	4 65	4 75	4 95	5 50	4 70
Plymouth Red Ash, net	....	....	4 75	4 95	5 50	4 70
Pittston, open market	5 10	5 10	5 20	5 40	5 85	4 85
Scranton	5 00	5 10	5 20	5 45	5 90	4 90
Old Company's Summit	5 25	....	4 90	5 00	5 50	4 85
N. Y. Lehigh Coal Ex	5 25	....	4 90	5 00	5 50	4 85
Honey Brook Lehigh	5 25	....	4 90	5 00	5 50	4 85

Freights from the above shipping ports to New York city are as follows, including the unloading:

Hoboken	40	Rondout	50
Weehawken	50	Elizabethport	40
Port Johnston	40	South Amboy	45

We quote as follows: Anthracite, $4·70 to $5·50; Cumberland, $6·25 @ $6·75; West Virginia, $6·75; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $11·50; American Gas, $6·75 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Newburgh Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $12; Newcastle Gas, $7; Scotch, $6·50 @ $7.

The Coal transported over the Cumberland Branch Railroad during the week ending Feb. 12, 1876, amounted to 48 tons, as against 1674 tons shipped in the corresponding period of last year, showing a decrease of 1626 tons. Over the Cumberland & Pennsylvania Railroad, for the same period, the shipments were 16,368 tons, against 13,818 tons shipped in 1875; an increase of 2550 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 113,545 tons.

OLD METALS, PAPER STOCK, &c.

Old Metals still continue unchanged from the dullness previously noted. The Rag market is without any active demand, and prices remain nominally unchanged. Book Stock, Gunny Bagging, Manila and Grass Rope are in good request, and, at present, scarce in the market. Other articles present no material change. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4½c. @ 4¾c.; Pewter, No. 1, 16c.; do., No. 2, 8c. @ 12c.; Spelter, 5¼c., Wrought Iron, $27 per ton; Light do., $14 per ton; Stove Plate, $12 per ton; Machinery, do., $14 per ton.

Rags, &c.—Canvas, Linen, 4¾c. @ 5¼c.; do. Cotton, No 1, 5¾c. @ 6¼c.; No. 2, 2¼c.; White, No. 1, 5¾c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¼c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2¾c. @ 3c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending Feb. 15, 1876:

Hardware.

Baldwin & Co.
Gun barrels, cs., 12
Boker Hermann & Co.
Mdse. pkgs., 10
Casks, 4
Folsom H. & D.
Mdse. pkgs., 5
Field A. & Co.
Mdse. pkgs., 15
Chains, cks., 143
Casks, 3
Packages, 6
Anvils, 70
Fuller Bros.
Chains, cks., 8
Cutlery, cs., 1
Hardware, cks., 3
Files, cks., 2
Sheep shears, cks., 2
Guental Geo. & Sons,
Mdse. pkgs., 4
Hayden, Gere & Co.
Cases, 4
Lau & Garthichs,
Wads, etc., cs., 8
Mdse. pkgs., 7
Laughland & Co
Wire, pkgs., 10
Langdon Thomas & Co.
Packages, 9
Noyes, Smith & Co.
Cases, 2
Noyes, White & Co.
Gun caps, cs., 4
Remington E. & Sons,
Mdse. pkgs., 2
Gun barrels, cs., 4
Schoverling & Daly,
Mdse. pkgs., 14
Van Wart & McCoy,
Mdse. pkgs., 4
Wiebusch & Hilger Mfg. Co.
Mdse. pkgs., 98
Anvils, 150
Packages, 27
Gun caps, etc., cs., 25
Walsh, Coulter & Flagler.
Mdse. pkgs., 2
Without Bills of Lading.
Cases, 1
Files, cks., 6
Emery stone, cks., 7

Iron.

Echeverria M. & Co.
Tubes, 100
Pipes, bxs., 1
Goddard & Bros.
Boxes, 100
Laughland & Co.
Hayhands, bdls., 283
Mitander Nils,
Bars, 1682
Moore D. & Co.
Sheet, bxs., 100
Naylor & Co.
Square bars, 864
Rough Swedish bars, pcs., 1511
Bars, 5296
Order.
Pig, tons, 300
Bars, 2340
Ore, tons, 250

Steel.

Brown Wm.
Cases, 30
Haigh J. Lloyd,
Rods, bdls., 70
Bundles, 390
Morton, Bliss & Co.
Scrap, spring, lots, 1
Naylor & Co.
Tires, cast, 9
Seddons R.
Cases, 15
Tyng & Co.
Tubes, cs., 1
Woodford W. O.
Cases, 51
Order.
Bundles, 800

Metals.

Byrne Joseph & Co.
Tin plates, bxs., 945
Bruce & Cook,
Tin plates, bxs., 1100
Darrell & Co.
Scrap, pkgs., 16
Brass pipes, 156
Gray John & Son,
Tin, cs., 1
Hart Lucius & Co.
Tin, ingots, 294
Tin, pkgs., 5
Meyers Moritz,
Lead, bars, 1821
Moore D. & Co.
Tin plates, bxs., 70
Pope, Cole & Co.
Copper ore, bags, 391
Phelps, Dodge & Co.
Tin plates, bxs., 14,620
Black taggers, bxs., 210
Tin, taggers, bxs., 100
Antimony, cks., 25
Rivera J. de & Co.
Precipatate of copper, tcs., 95
Order.
Tin plates, bxs., 6974
Tin, ingots, 300
Lead, pigs, 1607
Copper plates, cs., 2
Scrap, copper, lbs., 800
Without bills of lading.
Copper plates, cs., 2
Tin, ingots, 298
Tin plates, bxs., 4668

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Feb. 15, 1876.

PIG IRON.—Business remains quiet, and, though prices are steady, there seems to be no disposition whatever to purchase beyond actual requirements. Small lots probably realize something beyond our quotations, and it is equally likely that in some cases prices are shaded to meet the views of a desirable buyer. Sales of about 4000 tons are reported at $23 for

No. 1 Foundry, $31 for No. 2 Foundry and $30 to $22 for Gray Forge.

BARS.—Trade is quite limited and prices weak. Sales are reported of 50 tons extra quality at 2·5c., but the general price is 2·35c. from store.

RAILS.—There has been no business of importance since our last report, with the exception of a sale of 17,000 tons of Steel Rails to the Lehigh Valley Railway Co. by the Bethlehem Iron Co. The price has not transpired, but is believed to have been at low rates. We quote: Steel Rails, $63 to $65; Iron Rails, $42 to $44, with very little demand.

OLD RAILS.—The market is dull. We hear of no sales since our last, and quote $22·50 to $23·50, with some holders asking higher prices.

SCRAP.—Very little offering and difficult to quote, prices varying according to quality; $16 to $19 is about the range of Cast, $22 to $23 for light Wrought, and $26·50 to $29 for extra quality.

NAILS.—The demand does not improve much, and is chiefly of a hand-to-mouth character. We quote $2·85 to $3 for small lots, with some concessions to buyers of larger parcels.

TIN PLATES.—There is an improved demand, and the jobbing trade is reported active at the following quotations in currency: I. C., 10x14, $8·50 to $8·75; I. X., 10x14, $10·75 to $11; best Charcoal, leaded, 28x20, $17; other good brands, $16 to $16·75; good fair, $15 to $15·75; best Bright Tin, for cans, &c., $7·50; good Bright Tin, do., $7·25; Coke, leaded, 14x20, $6·75 to $7.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Feb. 15: The market for Iron is dull. There is, however, no accumulation of stock, and last week's quotations are the ruling rates. The only Anthracite furnace in Virginia, the Powhatan, has blown out. I understand the Elizabeth (coke) has also blown out. The Buffalo Gap, also (coke), will probably blow out in a few days. The fires in three-fourths of the Virginia furnaces are dead, and must soon tell on the prices. Some of the furnaces have made complete failures, and will probably not start up for many years.

Virginia cold blast Charcoal Pig Irons (according to brand)	$27·00 @ 33·00
Virginia hot blast Charcoal Pig Irons (according to brand)	24·00 @ 28·00
Va. hot blast Coke Pig Iron, No. 1 ex.	23·00 @ 24·00
" " " " No. 2 ex.	21·00 @ 22·00
" " " " No. 3 ex.	20·00 @
Virginia Anthracite. No. 1 ex	24·00 @ 25·00
" " No. 2 ex	22·00 @ 23·00
" " No. 3 ex	21·00 @ 22·00

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Feb. 10, report the Iron market as follows: Trade in the city seems to be very quiet, though several good sales have been made during the past week. Country orders are coming in gradually, and the demand seems to be reviving, though prices continue very low. We quote on 4 mos. time.

Mo. Stone Coal, No. 1 F'dry.	$25·00 @ 26·00—4 mos.
" " No. 2 F'dry.	24·00 @ 25·00—4 mos.
" " Gray Mill...	24·00 @ 25·00—4 mos.
" Charcoal, No. 1 F'dry...	24·00 @ 25·00—4 mos.
" " No. 2 F'dry...	23·50 @ 24·00—4 mos.
" " Gray Mill...	23·00 @ 24·00—4 mos.
Tenn. Charcoal No. 1 F'dry..	24·00 @ 25·00—4 mos.
" " No. 2 F'dry	23·00 @ 24·00—4 mos.
" " Gray Mill....	23·00 @ 24·00—4 mos.
Va. Coke Iron No. 1 F'dry...	25·00 @ 26·00—4 mos.
" " No. 2 F'dry..	24·00 @ 25·00—4 mos.
" " Gray Mill...	23·50 @ 24·50—4 mos.
H. R. Charcoal No. 1 F'ary..	26·00 @ 27·00—4 mos.
H. R. " No. 2 F'dry..	24·00 @ 25·00—4 mos.
H. R. " Gray Mill.....	24·00 @ 25·00—4 mos.
Massillon Iron, A, No. 1	31·00 @ 32·00—4 mos.
" " B, No. 1	29·00 @ 30·00—4 mos.
" " No. 2	27·00 @ 28·00—4 mos.
Cold Blast Car Wheel, Mo....	35·00 @ 40·00—4 mos.
" " Tenn.	33·00 @ 35·00—4 mos.
" " Ala..	33·00 @ 35·00—4 mos.
" " Hanging Rock	32·00 @ 33·00—4 mos.
Mo. Charcoal Blooms	60·00 @ 70·00—4 mos.
" Scrap "	55·00 @ 60·00—4 mos.
Mo. Charcoal Hammered Billets	75 00 @ 80·00—4 mos.
Assorted Bar Iron	@ 2·35—90 dys.
No. 1 Wrought Scrap	1·10 @ 1·25—cash.
Heavy Cast "	·75 @ ·95—cash.
Light Cast "	·50 @ ·60—cash.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Feb. 14, writes us as follows: The market is dull, but without changes in price. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores.	$25·00 @ 26·00
" 2 " " " " ..	23·00 @ 24·00
" 1 Mill, " " " ..	— @ —
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores.	$23·00 @ 24·00
" 2 " " " " ..	22·00 @ 23·00
" 1 Mill, " " " ..	21·00 @ 22·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
No. 1 F dry, from Missouri Ores	24·00 @ 25·00
" 2 " " "	24·00 @ 25·00
" 1 Mill, " "	25·00 @ 26·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores..	35·00 @ 40·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 38·50
Car Wheel from Kentucky Ores	28·00 @ 40·00

BOSTON.

FEB. 12.—*Pig* is dull indeed, the unsettled state of the coal market keeping all interest in abeyance. Holders here are stiffening up, but from what cause does not transpire, quoting No. 1, $28·50; No. 2, $26, and Gray Forge, $19. *Bar* is having a moderate trade at $50, with here and there a dealer putting in assortments. *Steel* is selling in a quiet, steady way, with prices held a trifle more confidently. We quote American Tool, 14c. to 15c.; American Machinery, 9c. to 9½c.; Bessemer Tires, 6¾c. to 7¼c.; Sweet's Excelsior Tire, 8½c. to 12c.; English Tool, 17c. to 18c., gold. *Copper*, with a very small business and a slight decline cabled from Chili, lost ¼c. on Wednesday and closed Friday in rather an uncertain condition, buyers offering 22¼c. for small lots and holders wanting 22½c. For manufactures we quote: New Sheathing, 30c.; Bolts and Braziers, 31c.; Yellow Metal Bolts, 20c. to 29c. *Lead* is in a little better request in a sort of jobbing way, with prices unchanged. We quote Pig 6c. for Domestic, and 6¼c. to 6½c. for Foreign; Sheet and Pipe Lead, 9c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 9c., less usual trade or 10 per cent. discount. *Antimony* is firm, with a small inquiry at 13½c. *Spelter* is strong and quiet at $7·45, 30 days, and $7·35, prompt cash, all currency. Silesian is dull at $7·75. *Tin*, although quoting lower in London and New York, secures no increase of business; on the contrary rather stagnates the trivial interest that has been manifested for a fortnight past. The receipts of plates have been large the past week, but they come to a weak and unsatisfactory market. We quote: Straits, 19c; Banca, 23c.; Refined English, 18½c. to 19c., gold. We quote Plates: Charcoal I. C., $7·50; Coke, $6·75 to $7; and Terne at $6·30 to $6·75, gold.

The new Rhode Island Horse Shoes are in, $1 a keg less than a year ago, but Burden is simply distributing samples without quotations. —*Com. Bulletin.*

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Feb. 12, write us as follows: PIG IRON.—The market continues in a moderately active state. Hanging Rock Charcoal Irons are placed sparingly on the market, some holders refusing orders for round lots, while selling freely in smaller quantities at same terms. Stone coal and Southern Irons are offering freely at the quotations below.

CHARCOAL.

Hanging Rock No. 1..	₱ ton. $25·00 @	—4 mos.
" " No. 2.....	23·00 @	—4 mos.
" " Forge.....	21·00 @ 22·00	—4 mos.
Southern Brands No. 1....	23·00 @ 24·00	—4 mos.
" Forge	21·00 @	—4 mos.
Virginia No. 1.....	24·00 @ 25·00	—4 mos.
" No. 2.....	22·50 @ 23·00	—4 mos.
" Forge.....	21·00 @ 22·00	—4 mos.

STONE COAL AND COKE.

Hanging Rock No. 1...	₱ ton. $23·00 @	—4 mos.
" " Forge.....	21·00 @	—4 mos.
Red Short No. 1.....	27·00 @	—4 mos.
" Forge.....	24·00 @	—4 mos.
Am. Scotch, No. 1.....	24·00 @ 25 00	—4 mos.

COLD BLAST.

Hanging Rock Car Wheel ₱ tn.	$40·00 @ 50·00	—4 mos.
Missouri " "	35·00 @ 40·00	—4 mos.
Southern Br'ds " "	30·00 @ 40·00	—4 mos.
Machinery and Forge.....	30·00 @ 35·00	—4 mos.
Blooms.....	.. @ ..	—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Feb. 15: Our last week's remarks apply equally as well to this. Competition for orders is so very keen that the profit is reduced to a minimum, and those booked are light and for early wants.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick.. } 1 to 4¼ wide by 1½ to 2 thick }	2 4-10 to 2 5-10c. ₱ lb.
Round and square, ordinary sizes, from ⅝ to 2 inclusive	2 4-10 to 2 5-10c. "
Hoop Iron, 1¼ wide and upward	3¾ to 4c. "
Band Iron, from 1¾ to 4 in. wide	3 to 3¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ⅝ thick	3¾ to 4c. "
Norway Nail Rods	7 to 7¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15 to 15½c. "
Machinery Steel	10 to 11c. "
Cast Spring Steel	9 to 9½c. "
Homogeneous Steel Plate	9½ to 10c. "
Perkins' Horse Shoes, per keg of 100 lbs	$4·62½
" Mule Shoes " "	5·62½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6
Putnam Horse Nails..	23	24	25	26	28c. per lb.
Globe Horse Nails...	23	24	25	26	33c. per lb.

R. R. Spikes ..... 2¾ to 3c.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Feb. 15: We repeat last week's quotations, with market inactive.

Baltimore Charcoal	$32·00 @ 35·00
Virginia "	28·00 @ 34·00
Anthracite No. 1	24·00 @ 25 00
" No. 2	22·00 @ 23·00
" No. 3	21·00 @ 22·00
White and Mottled	17·00 @ 20·00

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels*).

PARIS, Jan. 30, 1876.—*Metals.*—Business in the European metal markets, instead of improving during the first month of the year, has been getting worse. Nobody seems to feel inclined to anticipate future requirements in the least, consumers restricting their purchases to actual wants. Although money is easy on undoubted securities, it is difficult to procure it for undertakings of any kind which involve an investment for a lengthened or indefinite period. This is the natural consequence of the widespread financial and industrial disasters which occurred in Europe last year. The moment *bona fide* consumption slackens in any one of the leading metals, a decline soon follows, there being neither confidence nor a speculative support. *Copper.*—The weakness in this metal has made further progress, resulting in a decline of 10/ to 20/ in Chili bars at London, with little prospect of an early recovery. We have, nevertheless, remained steady here, though quiet, and quote, deliverable at Havre, Chili Bars, 215 francs; Common ditto, 212·50; Ingots, 222·50; English Tough Cake, 218·75; and pure Corocoro Ore, 212·50. Havre, in the absence of any transactions, quotes nominally for best Chili Bars, 213·75 to 215, good current ditto, 212·50, and Lota and Urmeneta, 210. Arrivals there, 180 casks Copper in ingots from New York, and in transit 141 bars, 10,908 ingots and 59 cakes. At Marseilles a better feeling prevails on the basis of 215, small ingots. *Tin.*—The result of the Dutch sale having been a favorable one, even more so than had been expected, its general effect has been to strengthen the markets, and to produce firmness, especially in forward parcels. We are firm here as follows, deliverable here or at Havre: Banca, 220; Straits, 215; and common English at Havre or Rouen, 210. Nothing has transpired at Havre. Marseilles is quiet; Straits at 210, Billiton at 205, and English at 215 to 220. *Lead.*—Now that the market has resumed a drooping attitude, it is difficult to effect any sales at all. At London a further decline of 2/6 has taken place, while we have remained tolerably steady here at 57·50 francs for French, 57 for Spanish and 58 for English, Belgian and German; old Lead, 51 francs. At Havre, soft Spanish is bringing 56. Marseilles is sustained as follows: Soft refined at 53 to 53·25; second fusion, 52·25; manufactured, 59. *Spelter.*—After having been remarkably firm, and gradually improving in the English market during about six months, it now suddenly turns into the opposite direction there, without as yet affecting quotations on the Continent. Little doing here without change in rates. We quote Silesian at Havre, 67·50; other good brands there, 67, and here, 67·25. The quotation at Havre remains 66·30; no change at Marseilles. All the foregoing quotations are per 100 kilos. *Iron.*—The Committee on French Forges has addressed a letter to the Minister of Commerce in which the hardships of this particular Iron industry are fully set forth, especially as regards the 5 per cent. internal revenue on railroad freights. There is nothing new to report as regards our markets in general for the week. The same relates to *Coal*, which has remained uninfluenced by the strikes in Belgium. No strikes are expected in France, where the mining population is better off than in Belgium, and would deem it very foolish to run the risk of a movement of the kind.

BELGIUM.

(*Revue Universelle*).

BRUSSELS, Jan. 30, 1876.—*Iron.*—The stagnation in Belgian Iron industry is uninterrupted, and we hear of nothing but complaints, nor are there any prospects for a revival during the spring season now drawing near. It is true the termination of the winter dead-lock generally brings along some commands for Merchant Iron and specialties, both for government and private repairs, but not sufficient to keep going our larger establishments, especially the producers of rails and railroad material. As matters stand at present our blast furnaces are suspending their operations, and our rolling mills are without orders. Such being the case the, Society of Iron Masters, of Charlerol, has gone into an elaborate statement of the evils from which our Iron industry is suffering, and adds thereto the suggestion that a committee be appointed by the government for the purpose of investigating the substitution of Iron ties for railroads in the place of wooden ties, upon the German plan, where it meets with great favor, and is extensively adopted. If the report of such committee should prove favorable, and Iron ties be adopted for our State lines, this would be a piece of good news for our Iron masters. Another subject which deserves attention are the improved methods of heating passenger railroad cars proposed in France, we trust to be as carefully studied among us. On the 11th proximo tenders will be opened involving the building of the new gas works of this city. *Coal.*—Work has been resumed pretty much everywhere, both at Charleroi and in the Central departments. The coal heavers of L'ege, despite the machinations that had been set on foot to inveigle them into a strike, have not quitted their mining posts for a moment. The result has been that Liege has been getting the orders, while the remaining districts stopped. Prices have not risen to any appreciably degree; there was a good stock, and Iron industry is too dull.

GERMANY.

(*Borsenhalle*).

HAMBURG, Jan. 29, 1876.—*Metals.*—The month under review has done nothing toward improving the Iron and general metal situation in Germany. In the districts of Hagen, Bochum and Dortmund a great many operatives in the iron works, discharged three months ago, have remained idle ever since, not to speak of the reduction of wages that have had to be resorted to. The blast furnaces of the New Scotland Company have been blown out, which has involved the dismissal of the Stocke and Schoenberg workmen. The Eisenstein Mining Company has stopped working. The Westphalian Car Works, the rolling mill of Funke & Elbert, the Railway Supply Company, the Hagen Steel Works and the Grunthal forges have all reduced production to a mere trifle. The Dortmund Bridge Company has discharged 350 workmen; the mining company there, 165, and the Schwerkmenden Company has cut down wages. The Bochum Steel Works have discharged 100 men; the same relates to the Langendrur and Schalke rolling mills. Matters in that part of the Rhenish provinces bordering on the river wear an aspect just as discouraging. *Copper*, quiet and unaltered; at Berlin, good qualities English and Australian range between 89 and 91·50 marks. Stettin is firm at 99. Here, Drontheim is offering at 92; Best Selected, 87; Minnesota, 110, and Quincy, 98. *Tin* is looking up; Berlin in particular is quite firm, Banca at 90 to 90·50, and English, 88 to 88·50. No change here. *Lead* still withstands in our midst the downward course inaugurated elsewhere. At Berlin the usual three sorts are worth 22·25 to 23. Stettin quotes Spanish 27, and German 24 to 25. Nothing transpires here; we nominally quote German 24 to 24·50; English, 24 50 to 25 in sheets, and 24 to 24·50 in pigs. The *Spelter* situation shows no signs of weakness in Germany; Berlin quotes good brands Silesian, 24·75 to 25·75. For want of any available lots nothing changes hands either here or at Breslau.

HOLLAND.

(*Koch & Vlierboom*).

ROTTERDAM, Jan. 28, 1876.—*Tin.*—The Trading Company's sale of Banca went off to day at 50 to 50¼ guilders, for about 15,000 slabs; the balance was withdrawn.

NORWAY.

(*Mining News.*)

DRONTHEIM, Jan. 10, 1876.—*Nickel.*—The recently discovered Nickel mines are within tolerably easy reach of the Trondhjem Fjord, quite new as a mining field, but the ore is in the right sort of formation. We are as yet without smelting works, and the question is whether the ore can be profitably returned in the interval. There are great inducements to search for similar mining fields in the extensive—many of them unexplored—regions of Norway.

AUSTRALIA.

(*Tasmanian.*)

GEELONG, Nov. 24, 1875.—*Tin.*—Although Mount Bischoff still continues pre-eminent, some important discoveries have been made in other parts of Tasmania. The northeast coast has furnished, up to the present, about 80 tons of rich Tin ore, independent of what has been raised near George's Bay. The Cameron and Ringarooma districts are also looming up. The Mount Bischoff Co. are dressing about 60 tons of high produce ore per month. There is a good supply of wood for small furnaces, but the latter Company forwards the ore to Launceston, where it is smelted with coal. There any of the miners can sell their ore for cash, according to the assay. Six hundred tons of Block Tin have thus been smelted in that city. As soon as the tramway from Emu Bay to Mount Bischoff shall be laid—12 to 15 months hence—there will be ore enough to keep two or more furnaces in operation.

CHINA.

(*Arnhold, Karberg & Co.*)

CANTON, Dec. 22, 1875.—*Lead* is improving. Sales of L. B. have been effected at $7·45 per picul, but holders now ask $7·60 to $7·70. *Tin.*—Sales, 1850 slabs. There is very little demand for export. Prices continue to go against buyers. We quote, $22·90 to $24. *Quicksilver.*—Sales of 1200 flasks California at $93 to $94. The market is unsettled, owing to the excessive supplies expected from San Francisco.

EAST INDIES.

(*Clarke, Spence & Co.*)

POINT DE GALLE (Ceylon), January 7, 1876.—*Plumbago* is very scarce. Owing to the want of activity on the part of miners only small lots of prime Lump are procurable, which come to stand fully £15 per ton; Chips, £8 to £9; and Dust, £4 to £5.

(*Gilfillan, Wood & Co.*)

SINGAPORE, Dec. 28, 1875.—*Tin.*—The price advanced to $23 12½ per picul, owing to disturbances among the Chinese miners in Malacca and consequent small supplies, but the riots being soon quelled, and arrivals being pretty free, there are now sellers but no buyers at $22·75 per picul. *Tonnage.*—The supply of disengaged vessels continues abundant, and rates are unchanged. The Hera is the only vessel now loading for New York. The Gordon Castle steamship is now here, but as she does not clear until to-morrow we cannot give a memorandum of the cargo she takes until next mail. For Boston there is no vessel loading, the Douglas Castle having cleared, taking 895 piculs. For New York via London, the Antenor took from Penang no Tin, but the Viking 1848 piculs. *Exchange*, 4/1⅝ to 4/1¾.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, ENG., Feb. 1, 1876.

THE LABOR MARKET

is again beginning to assume a troubled aspect, there being at the present time not a few disputes in one or other part of the country. The lock-out or strike at Erith on the question of piece-work or no piece-work by the operative engineers still exists, and is attracting a good deal of attention. The strike itself is of very small moment were it not for the fact (fully explained in my former letters) that it is understood to be the pivot whereon a general lock-out may hinge in case the men obstinately determine to contest the piece-work question. Up to now the fight has been simply of a skirmishing description. Messrs. Easton & Anderson, the employers, have quietly continued to engage men to fill up the places vacated by those who are out, while the men have "pickets" in all directions, who act as Uhlans, and cut off all the relief they can. Few of the new hands are said to have reached the works, yet the firm state they are managing very well indeed. So far, then, there is nothing of any great importance in the matter, but I can state on the best authority that should the firm be at all inconvenienced the masters generally will lock-out their men and fight the question of piece-work strictly on its merits. In other trades—notably the North of England iron trade—notices of lower wages have been given to the workmen, but in one or two instances (as at Sheffield) amicable arrangements have been arrived at.

FORTHCOMING MEETINGS.

The annual general meeting of the Iron and Steel Institute will be held in the rooms of the Institute of Civil Engineers, 25 Great George street, Westminster, on March 28th, 29th and 30th next. The first ordinary meeting of the Society of Engineers for the year will take place at 6 Westminster Chambers, Victoria street, on Monday, Feb. 7th, when Mr. V. Pendred, president for 1876, will deliver his inaugural address. Both these societies are year'y becoming more influential.

THE STATE OF TRADE

cannot, I think, be said to be improving. Things are most decidedly not yet movin' in an upward direction. Even pig iron, of which I last week spoke as being a remarkable exception to the otherwise general dullness, is now being neglected, and prices are in all districts somewhat weaker. Whether this relapse, which is as yet only of a slight character, is resulting from the cessation of speculative operations, or is merely the natural outcome of putting into blast additional furnaces, I cannot state. The next week or two ought to test the matter, at all events, seeing that in Belgium and Luxemburg the production of pig iron is now greatly interrupted by disputes with the workmen. Hence an increased demand is certain to be made upon the North of England for export. Should prices still droop, or, at any rate, not greatly stiffen under the influence of this additional demand, we may safely infer that our own internal trade is growing worse. In many branches this is confessedly the case, and prospects are portrayed in the gloomiest of hues.

SHEFFIELD MANUFACTURERS AND THE STATES.

At the annual meeting of the Sheffield Chamber of Commerce, last week, the evergreen subject of foreign tariffs came up with as much freshness and novelty as though it had never before been discussed. The backslidings, or the contemplated backslidings, of Austria in this respect were deeply and decorously lamented, while the notorious errors of the United States in respect of protection very naturally came in for a great deal of very cutting censure. The president, Mr. Wm. Smith, said that with respect to the United States of America, where the people had thought proper to introduce a system of protection, their trade seemed to be almost at a standstill. However, the intelligent people were finding that they had to pay an artificial price for the articles they required, and that those articles were deteriorating in quality from the absence of free competition on the part of the manufacturers of other countries, and they were also finding that the cost of living was artificially raised, and that employment was becoming more scarce. And surely it was not too much to suppose that they would be tired of a system under which all this was carried on simply to enrich a few producers at the expense of a great many consumers, and that they would give in their adhesion to free trade, and then Sheffield manufacturers would once more have an opportunity of entering America and producing in that country their wares in public competition.

Mr. W. K. Peace said he should like to add a few observations to those that had fallen from the president in reference to the American tariff. From recent advices from the other side of the Atlantic, there appeared to him to be a growing disposition to modify the exorbitant tariff which pressed so very heavily upon Sheffield goods; and he hoped in the course of time there would be a modification of the tariff. But from what he has seen of the manufactures of the United States, and from what he knew of the country, he did not think it was at all likely that Sheffield would ever again have anything like the trade with the United States that it had had in the past. He was satisfied that if the proportion of Sheffield to German, French and American manufactured goods, sold in the United States 30 years ago, had been kept up until the present time, it would have been utterly impossible for Sheffield or half a dozen Sheffields, to have supplied them. He could remember the time when an American store for the sale of hardware had a little space in the back part of the premises for a few little American "notions," whilst the great part of the stores was devoted to Sheffield, Birmingham and Wolverhampton hardware. Within 20 years of that time the case was entirely reversed. The manufactures of Sheffield and Birmingham were put into the corner, and the manufactures of America and Germany had extended so as to fill almost the whole store. He did not think the operation of free trade principles, as they had seen them exemplified in Europe, would altogether apply to the United States. We argued, during the time of the free trade agitation in this country, that protected industries failed, that the quality deteriorated, and that the enterprise of manufacturers began to stagnate; but that did not seem to apply to the American manufacturers. Whether they could make a profit or not, they would manufacture goods; and whether they could produce them economically or not, they would produce them of a good quality. He had never seen in his experience any established American manufacture that was not good of its kind. Some goods the Americans had been trying for years to make by machinery, and upon which hand labor had hitherto appeared to be necessary, and in reference to these they had not yet attained to that state of perfection which they had reached in the manufacture of axes, circular saws and tools of that kind. But now, even in the manufacture of files, which workingmen in Sheffield thought could not possibly be made except by hand, machinery has been made to manufacture them successfully. He learnt that the Americans were producing really first-class files by this means, which they could sell considerably lower than Sheffield files; and, in all probability, Sheffield would ultimately lose the bit of file trade which it now had, just as it had lost the saw trade. Of course, a modification of the tariff would give Sheffield an advantage; but whatever modification was made, they would have strong competitors in the manufacturers of America."

As Mr. Peace is a well known manufacturer, his remarks are entitled to some prominence, especially as he has discretion and courage enough to express the belief that what is well enough in Europe is not adapted for America. Mr. Peace, perhaps, remembers that there are in Sheffield industries as strictly "protected" as are any of yours—although in a different manner.

SCOTCH PIG IRON TRADE.

The Glasgow pig iron market was quiet during the whole of last week, with a recession of something like 1/ per ton in warrant quotations. Some of the makers' brands also declined to the same extent. There are now 62,726 tons in Connal's stores, a decrease of 118 tons for the past week. Shipments continue to fall off, as compared with 1875. Freights remain unchanged.

Writing from Glasgow, January 28, Messrs. James Watson & Co., said: "The warrant market opened quiet on Monday at 63/6, but improved in the afternoon to 64/3, since then, in the absence of business, the price has dropped to 63/5, closing this afternoon at 63/7½. Shipments last week were 6288 tons, against 7934 tons in the corresponding week of 1875."

	No. 1.	No. 3.
G. M. B., at Glasgow	65/	63/6
Gartsherrie, "	75/6	66/6
Coltness, "	80/6	67/6
Summerlee, "	72/6	66/
Langloan, "	75/6	66/6
Carnbroe, "	68/6	65/6
Calder, at Port Dundas	77/	65/6
Glengarnock, at Ardrossan	71/	66/
Eglinton, "	65/6	64/
Dalmellington, "	65/6	64/
Shotts, at Leith	75/6	68/6
Kinneil at Bonness	67/6	64/6

Messrs. John E. Swan & Brother's (limited), same date:

Glasgow Brands.	Furnaces Blowing, 117.	Furnaces Out 29.	Furnaces Built, 153.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	13	3	16	75/	66/	67/
Coltness	12	0	12	80/	67/	..
Summerlee	6	1	8	72/	64/	66/
Langloan	6	0	8	75/	67/	67/
Govan	5	0	5	65/	63/6	66/
Calder	4	0	7	76/	65/	66/
Shotts Bessemer	2	0	2	80/	..	..
Shotts Ordinary	3	1	4	76/	68/	..
Carnbroe	5	1	6	68/	65/	67/
Wishaw	2	0	2	..	..	..
Monkland	5	1	6	64/6	63/6	65/
Chapelhall	3	0	3	70/	..	..
Clyde	5	0	6	65/	64/	..
Quarter-Clyde	4	0	5	64/6	63/6	..

* f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 63/7½.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock	7	2	9	70/6	65/6	65/6
Ardeer	4	1	5			
Eglinton	6	2	8			
Lugar	4	0	4	65/	64/	65/
Muirkirk	3	0	3			
Portland	3	3	6			
Dalmellington	6	2	8	65/	64/	63/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil	3	1	4	67/6	64/	..
Almond	2	1	3	67/6	64/	62/
Carron Selct'd	4	2	6	72/6	..	..
Carron Ordn'y.				66/	..	..
Lochgelly	0	4	4	..	..	..
Camphinnans	0	2	2	..	..	..
Bridgeness	0	2	2	..	..	..

Furnaces in blast in Scotland....	Jan. 28, 1876—117
(Producing about 173 tons per furnace, per week).....	Jan. 23, 1875—118

TRADES OF SHEFFIELD.

No alteration of importance has taken place since my last report was published, nor does it appear likely that any change will have to be noted for some little time ahead.

The demand for pig iron has not been quite so strong, and prices, with certain exceptions to be noted presently, have hardly been maintained up to the figures heretofore current. Foundry iron is still selling more freely than the forge irons, although there have been several small orders filed for the better qualities of late.

The agents here for some of the best North of England producers now quote the subjoined figures, which are for the pig delivered in railway wagons, 5/ or 6/ or so to be added for carriage to works hereabouts. No. 1 foundry, 57/; No. 2 foundry, 55/; No. 3 foundry, 53/; No. 4 foundry, 52/; No. 4 gray forge, 52/; No. 5 forge, mottled, 51/; No. 6 forge, white, 50/; refined metal, 73/; kentledge, 61/; and cinder, 40/. Derbyshire pig is well upheld in price, many of the leading concerns being now well sold forward to a great extent on account of Staffordshire buyers. Hematite pig irons are steady, and in at least one instance an advance of 2/6 per ton has been established during the past week. Messrs. John Brown & Co., of the Atlas Works, are, I believe, still making and selling a good quality of spiegeleisen. I am not aware that any other concern in South Yorkshire is devoting its energies to the same object, but there is, it is stated, a Lancashire house which is doing pretty well in the same manner. It is certain, at any rate, that the home made article is gradually attaining a reputation which will ultimately wholly displace the imported spiegel, although the latter is quoted at a much lower price. Germany or other foreign spiegel is now £5. 10/ at Rotterdam or other continental ports, whilst English made ranges from £6. 15/ to £8 per ton, according to the proportion of its manganese contents, which, on the average, is from 15 to 22½ per cent. Much better results are said to be obtained from the use of the higher qualities of spiegel. There is but a very limited inquiry for all kinds of merchant irons, which are not very rigid as to price when anything substantial is required. The last price list issued by the Midland Iron Company, near Sheffield, quoted bars £9. 10/; edge tool iron, £10. 10/; best plating iron, £10. 10/; hoops, £11. 10/; and sheets, £14. 10/, all deliverable in Sheffield. Some of these figures might possibly now be shaded a little in favor of good buyers. Low Moor, Kirkstall Forge and Bowling irons are in moderately good, but not by any means extensive, request. Common bars of this district—say of Messrs. Wm. Cook & Co.'s, or other like make—are about £8 per ton at the works.

The cast steel trade remains dull and depressed in almost every department, although the secretary of the Steel Melters' Union, writing on Saturday to the Sheffield *Daily Telegraph*, stated that he thinks he can see a little revival in their particular branch of industry. I hope that such may be the case. Meantime quotations for the higher classes of cast steel are tolerably steady, not a few of the best houses having lately refused numerous orders which have been offered at less than the specified prices.

The coal trade is in a quiet condition, taking into consideration the fact that at this season of the year the demand is generally at its maximum, especially for all descriptions of household qualities. Prices remain steady. The steam coal owners met at Barnsley on Tuesday and discussed the subject of prices at some length, but I am without definite information at present as to what was decided upon, although I hear that it was resolved to make no alteration at present in this respect, thus leaving the price 11/ to 12/6 per ton. House coals vary in value to a very wide extent. Best Silkstones are 18/ to 19/ at the pits; a good Silkstone, 16/ to 18/; second qualities, 15/ to 16/; good ordinary house coals, 13/ to 15/; common, 12/ to 13/; small slack, 3/ to 5/; fair mixed coal, 5/ to 7/6; and gas coal, 8/6 to 10/6 per ton, according to quality.

The whole of the puddlers, ball furnacemen and other first processes men employed by John

Brown & Co., Limited, and Chas. Cammell & Co., Limited, Sheffield, the greatest iron making concerns in England, have received notices of reductions of 10 per cent. in wages. The men resolved to strike if the notices are persisted in. In that eventuality thousands of other men will be stopped. The Sheffield railway spring smiths are agitating, and the laborers in all branches yesterday sent out circulars asking for 12 per cent. advance, with reduced working hours.

The directors of the Sheepbridge Coal and Iron Company, Limited, near Sheffield, have declared an interim dividend at the rate of 10 per cent. per annum. The Sheepbridge Company is one of the most flourishing concerns in the district, and has an extensive and completely arranged plant, including six or seven blast furnaces and four collieries, all close to the works. A field of ore has been leased in Northamptonshire, and a new pit is being opened out in northeast Derbyshire, the latter being in an advanced state.

There is no news of any particular interest to report in connection with any branch of the cutlery trades. Everything remains quiet, even with the very best houses.

THE BARROW STEEL WORKS.

A telegram from Barrow-in-Furness this morning states that one months' notice was given at the Barrow Company's Steel Works, on Saturday, of a reduction of 5 per cent. in the wages of the workmen engaged in the Bessemer departments of those works. The telegram adds that it is believed the men will accept the masters' terms, otherwise hundreds of workmen would be stopped.

THE IRON TRADE.

The London *Times*, a few days ago, had a cleverly compiled article (which you will doubtless have noticed) on the British iron trade, its history, resources and probabilities, based on copious statistics which were embodied in the article. In a leader on the subject, the *Times* winds up by saying: "A steady, widespread and miscellaneous iron trade would be the best for all concerned, because it would induce fewer arbitrary changes in prices, fewer sudden risings and reducings in wages, and, therefore, less strife and bickerings all round. We may, perhaps, venture to hope that the result of the stagnation through which the trade is undeniably passing, and of the financial difficulties and political changes that contribute to it, will be to settle business on a more solid basis."

AN ARTFUL CANADIAN.

A Canadian gentleman, who must have had the renowned "heathen Chinee," Ah Sin, for his prototype, has been trying on a childlike and innocent little process with some of his creditors at Birmingham, in this country. The name of the gentleman is Zacharias Auerbach, and he carried on business as a wholesale jeweler at Montreal, Canada. His transactions were apparently on an extensive scale, for it appears that he had been in the habit of visiting England once a year for buying in purposes, many of his favors being placed with Birmingham houses. In February, 1875, Mr. Auerbach, as usual, appeared on the English stage and bought about £5600 worth of goods in Birmingham alone. These were paid for in acceptances. Presently, however, and with somewhat suspicious haste, a Mr. Dreyfus, brother-in-law to Auerbach, reached "Brum" armed with a power of attorney to settle Auerbach's affairs on a basis of 6/8in the pound, which was stated to be the very utmost the estate would yield. The creditors evidently did not wholly believe in the "childlike and bland" demeanor of the emissary, for they cabled to Canada and had all Auerbach's worldly possessions seized. A reply telegram informed the English creditors that their debtor had concealed a large quanity of property. Further than this, a clerk named Radell had confessed that he and another clerk had valued Auerbach's goods and had found that there was ample to pay 20/ in the pound. The wily debtor, however, had packed up and removed $20,000 worth, so as to leave just sufficient to pay 6/8 in the pound. The creditors immediately got Mr. Auerbach apprehended, and at a meeting held in Birmingham last week instructed their solicitor to prosecute that ingenious gentleman with all the rigor of the law. Moral—But, no, I think there is no morality about this.

STAFFORDSHIRE AND BIRMINGHAM.

The trade of these localities remains quiet and for the most part very dull. Quotations are quiet all round, ordinary bars at £8. 17/6 to £9; round oak (Lord Dudley's) bars, £10. 12/6; the B. B. H. bars of Wm. Barrows & Sons and T. P. K., of G. B. Thorneycroft & Co., are £10. B. B. H. Bloomfield plates are £13, and the same brand of best boiler plates, £14. "Best S. crown" boiler plates of the Swan Garden and Shrubbery Works, of Wolverhampton, are £12, and the same firms' "best best double worked" boiler plates, £13. The hardwares are in fairly good demand, but it cannot be said that there is any activity or prospect of it. The general brass foundry trades are pretty busy, and the inquiry for all classes of carriage iron work is very steadily kept up. The tin plate branches are satisfactorily engaged, and hollow wares are selling well.

ITEMS FROM SOUTH WALES.

During last week 61,000 tons of coal, 610 tons of patent fuel and 689 tons of rails were exported foreignwise from Cardiff. From Swansea 12,800 tons of coal and patent fuel were sent off. At Newport rather more Spanish ore is being imported. Iron rails are not inquired for, steel ones being now variably quoted at from £9. 15/ to £12 per ton. At the Landore Steel Works 28 tons of steel are being made every turn, and at Ebbw Vale 35 tons. In the tin plate trade it is probable that to-morrow notices of a reduction of 7½ per cent. from the present wages will be served upon the work people.

THE METAL MARKETS.

The metal markets opened quietly on Monday, little or no business being reported. On Tuesday copper was decidedly easier, but tin was steady with a good business doing. On Wednesday 50 tons Wallaroo were done at £89; tin being irregular. On Thursday lead was somewhat quieter, and tin rather better. On Friday tin suddenly became actively sought after, and closed dearer; £82 being paid for English ingots, and £79. 10/ to £80, Straits.

Messrs. Von Dadelszen & North say: "*Metals.*—Copper unchanged. No sales reported in foreign. G. O. B. Chili bars quoted £80. 10/ to £80. 15/; Burra, £86 to £86. 10/; Wallaroo, £80; English tough, £86 to £87, best £87 to £88; manufactured strong copper, £94; Indian sheets, £91; yellow metal, 7⅝d. per lb.; sheets, 7¾d. per lb. *Tin* very active, and dearer; sales of foreign amount to about 250 tons; Straits on the spot at £79 to £79. 10/; to arrive, £79 to £80. Australian, cash, at £78. 10/ to £79. 10/; the latter being for a special brand; for arrival, £78. 10/; English ingots sold at £82. *Spelter* steady, at £25. 7/6 for common Silesian. *Lead* quiet, at £22. 10/ to £22. 15/ for good soft English pig. *Quicksilver*, £10 per bottle."

The *Mining Journal* remarks: "*Lead.*—The market continues quiet. Good soft English pig is quoted £22. 10/ to £22. 15/, and soft Spanish, without silver, £22. 5/. *Spelter.*—The market is firm, and there are sellers of Silesian at £25. 10/. *Tin.*—Straits and Australian have been quiet throughout the week. The market is a shade firmer, and business is reported in Straits at £79, and Australian £78, cash. The Dutch sale of Banca went off to-day at 50g. to 50½g. for about 15,000 slabs; the balance was withdrawn. Our market has strengthened since the announcement, and sales of Straits are reported at £80, and Australian £79. 10/, sellers remaining. *Tin Plates.*—The market continues very dull, and without any material alteration. *Copper.*—The market has been very quiet throughout the week, and quotations for manufactured especially have been hardly maintained. The price of Chili bars shows a reduction to the extent of about 10/ per ton upon last week's quotations, and it is evident from the slackness in the demand for manufactured that prices of Chili bars must still further recede to an extent of £2 to £3 per ton, in order to enable smelters to execute orders at current limits. The statistical position of this metal remains unchanged. Stocks and supplies are as they were. There is no appearance of any speculative movement to help the market; indeed such would be of little avail. A lower scale of prices all round might, and probably would, establish a different state of things, but nothing else would. Chili bars, g. o. b., £80. 10/; Wallaroo, £89. 10/; Burra, £88. 10/ to £89; tough, £85 to £86, and 4 by 4 sheets £91, strong sheets £94, and yellow metal 7⅝, at which price business has transpired in sheets and sheathing without reference to brand."

Messrs. J. Berger Spence & Co., report to-day: "*Lead* during the week has manifested very little alteration; if anything prices are slightly easier. *Copper* opened dull, and as the week advanced became decidedly weaker. At the present B. S. ingots display a slight advance. *Tin* continues inactive. Prices are, however, firmer. *Spelter* is in good request, and there is a corresponning advance in rates."

Latest Liverpool iron and metal prices are:

Iron: f. o. b. in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Merchant bar	7	10	0 @	8	0	0
Merchant bar, in Wales	7	0	0 @	7	10	0
Staffordshire	8	5	0 @	11	15	0
Hoop	9	10	0 @	10	15	0
Sheet	11	10	0 @	11	15	0
Nail rod	8	5	0 @	9	0	0
Bar, best crown	8	5	0 @	8	15	0
Boiler plates	10	10	0 @	12	0	0

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.	£	s.	d.
Charcoal, I. C.	1	6	0 @	1	8	0
Coke, I. C.	1	2	0 @	1	4	0

Copper: Delivered in Liverpool, per ton.

	£	s.	d.	£	s.	0
Bolt and Sheathing	97	0	0 @	0	0	0
Tile	90	0	0 @	0	0	0
Tough cake	90	0	0 @	0	0	0
Best selected	92	0	0 @	0	0	0

Eugene Schneider.

In the death of Eugene Schneider, France lost a man whom no country could have well spared. M. Schneider was born at Nancy in the year 1805. Of his earlier career not much is minutely known in this country, but about 1830 he was in the position of an iron master, and comparatively wealthy. His brother, M. A. Schneider, was a banker, and therefore possessed of considerable capital. They were men of indomitable energy and great resource, and from a comparatively early period in his life M. E. Schneider became impressed with the desirability of embarking in some of the great engineering speculations which had already given fortune and fame to not a few Englishmen. In 1782 there had been established an ironworks at Creusot, where it was proposed to work the then novel Williams-Wilkinson process of making iron with coke. The place had a comparatively small beginning, and passed through many vicissitudes. In 1838 it was purchased by the brothers Schneider, and under their management it rapidly became not only the largest establishments of the kind in France, but one of the largest in the world. At one period Messrs. Schneider gave employment to over 10,000 hands in their collieries, iron works, and engine factories, and as far back as 1844—that is to say, in the short period of six years after Creusot came into their possession—no fewer than 3000 men were employed. In 1845 M. A. Schneider met with an accident which resulted in his death. His brother mourned his loss, but he did not pause in his endeavors to make Creusot celebrated all over the world. It is said that one of the proudest moments in his life was that in which he received an order from the Great Eastern Railway Company, England, to supply forty locomotives. These were fast passenger engines with outside cylinders. Several were delivered in England in 1865—but we believe that the whole order was not completed because of the unfortunate financial position of the Great Eastern Railway—and are still employed in working the passenger traffic of the line. A good deal of interest was created both in France and England by the transaction, and deductions drawn from it at the time which have not been justified by subsequent events.

A man of M. Schneider's abilities and ambition was unlikely to remain in private life. Early impressed with the conviction—rightly or wrongly—that it was only when France was ruled by an emperor that her people could be free from the toils of the demon of unrest, he joined the cause of the late Emperor Napoleon the Third, and used all his not trifling influence to make the Emperor's seat on the throne of France firm and enduring. The Emperor was not ungrateful. Elected in 1845 to the Chamber of Deputies, and to the Council-General of Saone-et-Loire for the canton of Mont Cenis, he became in 1851 Minister of Commerce and Agriculture. Thus trained for a public life, after the *coup de'etat* he was elected, as a government member, to the Corps Legislatif, of which he ultimately became one of the vice-presidents. In 1865 he several times took the place of the Duc de Morny as president, and from 1867 he always filled that post. M. Schneider was elected in 1845 member of the General Council of Manufacturers, and was also at one time a governor of the Bank of France and president of the Societe Generale.

It will be seen that M. Schneider played no insignificant part in the political history of France. But it is hardly for this reason that his name will be remembered among his countrymen; and the great reputation which he bore among the men of other nations is based on a totally different aspect of his life. M. Schneider, ably assisted for years by his brother, was one of the very first to prove that France could compete successfully with England in the manufacture not alone of iron, but of almost every article into the construction of which iron largely enters. The reputation of Creusot—or, more strictly, of M. Schneider's shops at Chalons—for iron bridge work still stands almost unrivalled. As examples of the operations of the firm in this direction, we may cite the great Fribourg viaduct, the bridge of St. Just in the Ardeche, the viaduct of St. Germain des Fosses, and the wonderful El-Cinca bridge in Spain, which spans a ravine 245 ft. wide at an elevation of 115 ft. above the torrent which roars below. M. Schneider appeared to possess the rare facility of gathering able minds around him, and his powers of organization being almost unlimited, he was enabled to undertake structural operations of a magnitude which would have deterred smaller firms under less energetic management. The confidence which existed between M. Schneider and many of the great civil engineers of France was mutual and well founded. What the one could design the other could construct, and the latitude thus allowed to the designers no doubt contributed largely to the production of important works.

The great benefit conferred on a nation by such men as Schneider lies in the power which they possess of convincing their fellow-countrymen that they can, if they please, become wealthy by developing the resources stored in the earth beneath them. Half a dozen men of the Schneider type would suffice to establish a great iron trade in the wilds of Africa if only coal and ore were to be had. Again, M. Schneider loved peace because it meant prosperity. We do not assert that he ever held the doctrines of the peace-at-any-price party, but he hated the spirit of revolution, continually seeking rest and finding none, which is fatal to the operations of capital. In France there is now—there always has been—too much inquietude and uncertainty concerning the future to permit capital to do its best. It is because M. Schneider was one of those who are content to put up with certain evils rather than lose possible good in the pursuit of uncertain blessings, that France can ill spare him. In Creusot, however, he has left behind him a memorial of the excellence of his policy, the soundness of his opinions, and the accuracy of his conclusions, which will not be easily overlooked. France is not without men competent to follow in M. Schneider's footsteps; and it is in such men her best hope lies of attaining once more that dignified national position which she is no doubt entitled to enjoy.

Shipbuilding in the United States.

Statistics of shipbuilding in the United States during the past year would indicate an apparently important falling off compared with previous years. True, the number of craft constructed is below the total of any year since 1862; but this diminution occurs principally in a class of vessels which do not figure very prominently in the shipbuilding industry proper, such as canal boats and barges. Of these, the total for 1875 was 340, against 995 in 1874 and 1221 in 1873, and about 850 as the average for the previous seven years. The cause of the decrease is obvious enough. Railroads have diverted no inconsiderable amount of business from the canals, thereby limiting the use of canal boats and barges. Turning to the business at large, we find an important augmentation in the number of ships and barks built, while the construction of other large craft shows but a slight decrease. The following shows the yearly business since 1866:

	Ships and barks.	Brigs.	Schs.	Sl'ps, canal boats and barges.	Stmrs.	Total.
1866	96	61	427	926	318	1888
1867	93	70	517	657	180	1519
1868	80	48	590	848	236	1802
1869	91	36	565	816	277	1726
1870	73	27	519	709	290	1618
1871	40	14	498	901	302	1755
1872	15	10	426	900	292	1643
1873	28	9	611	1221	402	2271
1874	71	22	655	995	404	2147
1875	114	22	502	340	340	1318

Here we find the total number of ships and barks built during 1875 to be 43 in excess of 1874, 86 over 1873, and 99 more than in 1872. The total for 1875 is the largest for any single year since 1858. The number of brigs built is the same as in 1874, is 13 over 1873, 12 over 1872 and 8 over 1871. The total number of schooners constructed was 502, as against 655 in 1874 and 611 in 1873. The schooner product of these two years is equal to the average of any twelvemonth in our history, and, consequently, the falling off in 1875 is comparatively insignificant. There are but seven years which show a heavier total of steamers than that of the past year, while the grand aggregate is fully up to the yearly average of the past quarter of a century. As has heretofore been stated, three fourths of the sailing vessels were constructed in the ship yards of Maine. Next in order follows Massachusetts, which has turned out the greater amount of heavy craft. As to the entire extent of our commercial marine, the total number of vessels is 32,285, representing a tonnage of 4,853,732. This shows an increase of 53,080 tons over the total of 1874, some 157,700 tons over 1873 and 415,995 ecompared with 1872. Glancing over the tonnage reported at the close of each year, we find the total of 1875 greater than that of any previous year since the war. Of this total, the inland marine represents 1070 steam vessels, 1842 barges and 212 sailing vessels, representing a tonnage of 418,964 on the Western rivers, and 891 steamers, 2702 canal boats, 1710 sailing craft and 193 barges on the Northern lakes, the aggregate tonnage of which is 837,891. The Pacific coast possesses 255 steamers, 884 sailing ships and 86 barges, with a total tonnage of 229,257; not much over half the river tonnage. The remainder belongs to the Atlantic and Gulf States, and composes the great proportion of the whole, being nearly three-fourths of all, divided into 15,548 sailing vessels of different sorts, 2019 steam vessels, 5106 canal boats and 767 barges—23,440 craft of all kinds.—N. Y. *Bulletin.*

Action of Water Upon Tin.

Pure tin is less acted upon, either by water or saline solutions, than any other of the common metals. When exposed to the combined action of water and air it does, indeed, oxidize slightly, but the oxide being insoluble remains attached to the tin unless mechanically removed. The ordinary constituents of potable water have but little effect upon tin, even when in concentrated solutions. Dilute acids destroy it, even the vegetable acids, as do the caustic alkalies. The following experiments by E. J. Hallock, of Columbia College, upon the action of saline solutions on tin, may prove of interest in this place. When a piece of block tin, free from lead, is exposed for four weeks to the action of a strong solution of common table salt, (chloride of sodium), the solution becomes slightly milky, and gives a reaction for tin, although very faint, and slowly produced. On filtering the liquid failed to give any reaction, indicating that the oxide of tin was suspended and not dissolved in the liquid. Strangely enough the amount of tin in solution at the end of ten months was little, if any, greater than at the end of one month. Several other salts were tried with similar results. Nitrate of ammonia, chloride of magnesium and chloride of calcium acted upon tin sufficiently to give a tin reaction within a few days. Croton water which had been concentrated until it contained 22 grains of salt in a gallon, in contact with tin was soon found to contain a trace of tin. Solutions of chloride of ammonia and of bicarbonate of lime required at least six weeks to acquire a perceptible trace of tin. Sulphate of lime forms a protecting incrustation upon tin.

The nitrates and nitrites have a perceptible action on tin when concentrated. It was not found practicable to determine the loss of weight in the tin, owing to the difficulty of removing the incrustation of oxide formed upon it. Two points were, however, clearly demonstrated: First, that tin is acted upon by most saline solutions, although very slightly, even when exposed for a long time; secondly, the oxide and whatever other compounds—probably oxy-chloride—were formed, remain *suspended* in the liquid, and could readily be removed by filtration. Tin salts are not injurious when taken internally; hence, from a sanitary point of view, it is immaterial whether potable water takes up tin from the pipes or not.

It is a curious fact that saline solutions dissolve out the lead from tin-lead alloys, even if the amount of lead be very small. Weber analyzed a slimy deposit found in a salt water bath in Reischaur's laboratory, and found it to consist of 68 per cent. oxide of tin and 21 of oxide of lead, although the alloy of which the bath was constructed contained but 15½ per cent. of lead to 81 of tin.

It is reported that certain well waters corrode tin pipe rapidly, but we have been unable to obtain specimens of such water, and are not able to say to which constituent they owe this corrosive action. It is not impossible that the metal alloyed with the tin in the manufacture of such pipe constituted a very important factor in this reaction. A well water which is competent to destroy pure tin ought, we think, to be subjected to chemical analysis before venturing to use it for drinking, the probability being that it contains some unwholesome constituent, to the presence of which it owes its corrosive action.

The Stove Trade and Its Evils.

CINCINNATI, O., Feb. 7, 1876.

To the Editor of The Iron Age: DEAR SIR—As you invite discussion in your intelligent paper in reference to the stove trade, please be kind enough to allow me a brief space.

It is asserted, and I know with truth, that the profits of no other similar line of productive are smaller. I add, no other business whose profits are more over-estimated. To this mistake may be traced many of the recriminations between manufacturers and their patrons. Other difficulties besetting the stove trade, both that of manufacturing and retailing, are jointly the result of these two. Who is to blame? I answer: 1st. The manufacturers, for countenancing and making the "novelties" which they claim are so expensive and yet acknowledge to be so worthless. 2d. The retail dealers, because they seek "novelties" only, and exhaust their own understanding in trying to impress upon a "customer" the value of these "improvements," to the exclusion of the more substantial merits of the stove.

There are undoubtedly great differences between the productions of various manufacturers, yet it is a notable fact that the valuable qualities are slighted and the worthless enthusiastically exposed when a sale at retail occurs, thus encouraging a demand for expensive features which have absolutely no corresponding value, except as "things to talk on," to use a stereotyped phrase in stove parlance.

The manufacturers and retail dealers have matters exclusively within their control. Both parties can build up an honorable and extensive trade upon merits more durable and margins more satisfactory than the present system affords. If the manufacturers would resist the adding of improvements, falsely so-called, and instead thereof, confine themselves to the various lines, each representing substantially a different grade of goods with different prices. If polished edges are wanted, let them be put on a certain grade, and not put on the cheapest and lightest stoves, as well as upon those sold as first-class. This rule should apply to each of the hundred new trinkets, in order that the trade generally might be able to distinguish one class of goods from the other, which at present it is almost impossible to do.

If the retail dealers are business men (and I know many are), they can control and bring up their trade to suit themselves. Many, however, allow their customer's "notions" to run away with them, and, indeed, others there are who would gladly sell and who do sell a stove below cost, for the satisfaction of "knocking" a neighboring competitor out of it.

It would be very easy for dealers in the same town to have a mutual understanding as to prices for the different grades of stoves represented, which should be equitable and made to yield a reasonable profit, and which should be abided by honorably. There can be no question that he who buys a stove for his own use would pay such a price, and, in the face of known facts, it would be taking no advantage of him. That would be better than the "cut throat" system now so thoroughly patronized in all sections, involving labor and risk for nothing, and engendering personal enmity between neighboring competitors.

If I have indicated any point which may serve to improve matters in the stove trade I have accomplished my object. At all events your interest, Mr. Editor, in the subject, and the facilities your paper affords for a full discussion, is praiseworthy and generous, and must result in incalculable benefit to the trade generally. DRUMMER.

TROY, N. Y., Feb. 14, 1876.

To the Editor of The Iron Age: DEAR SIR—I have been much interested in the articles which have appeared in your valuable paper from time to time, discussing the condition and prospects of the stove trade of the United States, especially those in which you consider the evils which beset it and the dangers which threaten it. As you invite discussion, I trust you will give space to my communication.

I am a stove manufacturer and have been in the business many years. During much of the time covered by the period of my connection with it, the business has been fairly and, at times, largely profitable. During the past few years, however, this has not been the case. Until about six years ago my business consisted entirely in the manufacture of a few lines of standard stoves. I changed my patterns only so much and so often as was necessary to keep them up to what we considered the highest excellence. Under these conditions the business paid. When we got a new set of patterns we knew what they were, and we knew that we could cast enough stoves from them to make the improvement profitable. The additions to our catalogue were few, and we found our well known styles and names a safer dependence than any new stoves we could put on the market. When some of the principal manufacturers began to compete in the matter of "novelties," each trying to get out more styles in a year than their neighbors, we made up our minds that the old method of doing business suited us better than the new, and that we should do better to stick to our standard styles than to change them. Our customers wanted more illumination, claiming that our goods looked old-fashioned beside those of some of the other founders. We knew very well that there was a limit to the amount of mica which could be put into a stove without interfering with its working, and that our stoves had all the illumination that was good for them. But we had to meet the demand to save our trade. Then our customers wanted one thing after another, until, against our will and against our intention, we drifted into the whirlpool, and are now making what you call "novelties" almost exclusively, and as for the "frills," of which you speak, we will match our stoves against any in the market in that respect. They are "full jeweled." We did a large business last year, but, instead of a profit, we netted a loss, and from present appearances it looks as if the chances of getting out with a whole skin this year were extremely small.

Now, you will probably say that we were foolish to allow ourselves to be led away by the demands of our customers. But the fact is, we could not help ourselves, and if we were foolish in anything it was in not selling our foundry and leaving the business five years ago. Now we cannot do it. To go on is dangerous, to stop would be ruin. We must make first what our customers want to buy, not what we would prefer to sell them. We are not making as good stoves to-day as we did ten years ago, they cost us more, and we get less for them. We are not making a single stove to-day that will be wanted by the trade two years from now, and were we to put our old patterns in the sand, we should have our trouble for our pains—no dealer would give us cost for them.

Now, what is the remedy for this condition of affairs? I see none which the manufacturer can apply. If the dealers would call for good, plain, cheap substantial stoves, we would be glad enough to make them, and nothing else. But they don't want them, and the manufacturer cannot afford to make stoves that won't sell, merely to carry out his own ideas or preferences.

If the dealers have anything to complain of in the present condition of the business, they have the remedy in their own hands. Let us hear what they have to say on the subject.

Yours, truly, BASE BURNER.

"It has been said," says Mr. Jewell, "that my system of fast mail trains is not worth what it costs. The fact is that fast mails do not cost any more than slow ones. The department pays so much per hundred pounds or ton for carrying the mails. The transportation costs just as much when the trains run 25 miles an hour as when they run 45. In some cases additional postal cars are necessary, and a few additional clerks, but I have looked carefully into the figures, and the total expense of running all the fast trains in the country over the other system is not over $50,000 a year, and the benefits are already incalculable."

BUSINESS ITEMS.

MAINE.

Two hundred and twenty men are now at work at the Katahdin Iron Works cutting wood, &c. One hundred and twenty horses are also in use, hauling wood and iron. Last week over 1500 cords of wood were cut and delivered from distances of one to three miles from the furnace, and 70 tons of iron were made and shipped. The No. 1 extra iron, for foundry purposes, is in good demand, with orders ahead for 300 tons; but for other grades there is little demand at present. A car load of Katahdin iron has been shipped to the scale manufactory of E. & T. Fairbanks, St. Johnsbury, Vt.

Shaw's new tannery, at Limerick, to be of a capacity to tan 500 tons of sole leather, is to have an iron roof to protect it from fire.

The Portland Company, of Portland, has received from various parties orders for machinery for five steamboats to be used in the porgy fisheries. The hulls will be built in the yard of Morrill Bros., East Deering.

MASSACHUSETTS.

A two story wooden building 100x18 feet will be put up by Prof. Mowbray, North Adams, on the site of his late glycerine works. It is intended so to model the new works, that by a supply of warm and cold air, and warm and cold water, with leaden floor, the risks from spilling nitro-glycerine, and from thawing out when it has congealed, will hereafter be entirely removed. At the close of each day's work, the last vestiges, whether of nitro-glycerine, acid vapors, or water impregnated with the same, will be entirely cleared away. As originally constructed, these works were not complete in this respect, and although frequent reconstruction and additions have been made from time to time, still the unwillingness to tear down and use pick and crow bar over the site of the old buildings prevented a thorough re-arrangement. About two hour's work, every day, will be the limit of manufacturing, and only fixteen minutes of this in handling the explosive. The remainder of the time will be spent in clearing up and preparing for the next day's run. Thus danger will, at least, be reduced to a minimum.

At the Knowles Steam Pump Works, Warren, they are at work on two huge pumps for the Chicago Water Works.

Mr Hitchcock has applied to Congress for an additional appropreation of $50,000 to enable him to finish his big gun, now in process of construction at the "Water Shops," Springfield. It is asked for the purpose of putting in a Siemens furnace. This gun is an attempt to utilize our old cast iron ordnance by the use of internal plates of wrought iron. These plates were made some months ago at Graff, Bennett & Co's Millvale Works, Pittsburgh, in the Danks furnace.

The Haydenville brass shop workmen have suffered a 15 per cent. cut-down.

It is not true that the Washburn & Moen Manufacturing Company, of Worcester, wish to buy Richard Sugden & Co's wire works at Spencer; they have, however, the refusal of J. R. & J. E. Prouty's wire property, and may possibly take it.

The Franconia Iron and Steel Works and the Parker Nail Works have reduced wages 10 per cent.

The Armory at Springfield was commenced in February, 1777, and attained some considerable importance by August of the same year. The first gun reparing was done on Mill River with a home made "reamer" attached to a grist mill gearing.

NEW HAMPSHIRE.

The Nashua Lock Co. have cut down wages, except the molders, 10 per cent.

NEW YORK.

The Fletcher Furnace, Pratt & Co., Buffalo, has been in blast since last July, and is doing finely as to make and quality.

One of the Onondaga furnaces at Geddes, near Syracuse, is in blast and the other idle. Ten per cent. of coke is used in connection with anthracite.

NEW JERSEY.

The Passaic Rolling Mill is running day and night, with nearly four hundred men at work. The wages have been slightly reduced, but by increasing the number of "heats" per day, the pay amounts to as much as before, many of the employes earning $4 per day, and some double that sum.

The glass industry of New Jersey is located principally in South and West Jersey. The most extensive factories are located at Glassborough, Bridgeton, Clayton and Millville, populous and flourishing towns on the line of the West Jersey Railroad; and Winslow, Malaga and Medford, equally prosperous and well populated villages on the Camden & Atlantic Railroad. The representative factors are Whitney & Co., Glassborough; Moore Bros., Clayton; Bodine, Thomas & Co., Williamstown; the Cohansey Mfg. Co., Bridgeton; Haney & Co., Winslow; the Malaga Glass Works of Ward & Co., and the Phœnix Glass Works, Whitall, Satum & Co., Millville.

DELAWARE.

All the Wilmington car shops are running on new work, recently ordered, and the wooden shipyards show an increased activity, with a bright prospect ahead.

MARYLAND.

McShane's foundry, at Baltimore, is casting a chime of 12 bells for a tower to be erected on the Centennial grounds.

PENNSYLVANIA.

The two Westerman furnaces, at Sharon, are making 60 tons of foundry iron per day.

The following iron works are now busy, at Danville: The Pennsylvania Mill, owned by Waterman & Beaver, giving employment to about 300 men, and manufacturing 500 tons of rails per week. Two of their furnaces are also in blast. The Co-operative Mill is running on a small scale, giving employment to a few men; the Danville Iron Works are also in motion, and Grove's two furnaces are in blast. The National Iron Works, recently purchased by John Roach, the shipbuilder of Chester, are standing idle. Hopes are entertained by the people that he will soon put them in order and start them up again.—*Luzerne Sentinel.*

Reis, Brown & Berger, Newcastle, started their mill last week.

Bradley, Reis & Co.'s sheet mill, New Castle, is running double turn.

The Clara Furnace, of the Crowther Iron Company, Newcastle, is being rapidly relined, and will be ready to blow about April 1st.

The Monocacy Furnace, at Monocacy, Berks county, is making about 200 tons of pig per week. They are about erecting a shop for car repairs.

The old Sharpsville Furnace, Sharpsville, which has been out of blast for about three years, blew in on the 9th. She has always had the reputation of making good iron.

Mount Hickory Furnace, No. 2, which went out of blast a few days ago, will resume operations as soon as repairs are completed, which will only take two or three weeks yet. We learn that this furnace contracted last week for 2500 tons of metal.

There stands on Jacobs' Creek, Fayette county, the crumbling remains of a furnace stack built in 1792, by a Frenchman named Turnbull.

Kimberly, Carnes & Co., Sharon, are building a wing to their hoop mill, 210 feet wide and 75 feet in length.

The difficulty with the heaters and rollers at Westerman's mill, Sharon, has been arranged, and the men are again at work.

PITTSBURGH AND VICINITY.

In our editorial columns will be found the result of the conference between the boilers and manufacturers as to the price of boiling.

The roughers and catchers at Jones & Laughlin's struck Monday against a reduction of wages.

The glass works of Bakewell, Pears & Co., flint glass, resumed operations Monday. The employes have been notified of a 10 per cent. reduction.

The Star Fire Brick Works, Messrs. Harbison & Walker, have in course of manufacture linings for the Isabella, Clara and Fannie furnaces.

At the Chilian Exposition Messrs. Hussey, Burns & Co. took the first premium for shovels.

The U. S. Iron and Tin Plate Company are running their works full, double turn, and making from 150 to 160 tons of black plates, mostly fine sheets, and 20 tons of tin and terne plates per month.

The Dexter Spring Works, at Hutton, which went into operation last July, manufacturing a patent carriage spring, are driven to their utmost present capacity, turning out 12 sets per day.

Porter, Bell & Co., light locomotive works, are running on eight hours.

A. Garrison & Co. are making a set of Lauth's three-high rolls for the Centennial. They are a splendid piece of workmanship.

The first still in which petroleum was refined, by the late Sam'l Kier, of Pittsburgh, is still in existence, and will be exhibited at the Centennial.

The Lucy Furnace is relined, and the fires are in her to dry her out. She will be in blast again in two weeks.

Messrs. Jones & Laughlins, of this city, have received the contract for furnishing the shafting, pulleys, etc., for the Centennial buildings. The amount of the contract is very large.

The foundry and machine shop of W. J. Anderson was sold on the 3d to Messrs. Hay & Shinkle for $16,000. These were the works of the late S. S. Fowler, and were at one time the most complete in the West, having almost the monopoly of the mill furnishing business in this section. But a few years ago a half interest sold for $75,000.

The Pittsburgh Chain and Car Link Company Works, at New Brighton, are making arrangements to begin work at once. Boston capitalists are to furnish the funds.

Franklin Platt, Esq., of the Pennsylvania Geological Survey, has been at Spang, Chalfant & Co.'s mill, the past week, experimenting on the use of natural gas, collecting data for his forthcoming report.

Isabella Furnace No. 1, 75x18, completed the third week of her present blast last Tuesday, having been blown in on the blowing out of No. 2. The furnace is coming up to her work nicely, making already over 500 tons per week. No. 1 is the first furnace in this country to make over 700 tons a week. In relining the Isabella Furnace bricks 30 inches long are to be used, instead of 17 inches, as before. Some difficulty has been experienced in making them this size, as in drying the bricks pulled apart in the middle, but by spreading saw dust on the floor of the dry house this trouble was obviated. Star brick will be used for the lower part and Barnes for the upper.

The new Pittsburgh and Northwestern Railroad, which promises to be of so much benefit to Pittsburgh iron masters, is all under contract, to be completed by Jan. 1, 1877. The road extends from Pittsburgh to Youngstown, 70 miles. This road, although built by an independent company, will connect with the Baltimore and Ohio, at Pittsburgh, and the A. and G. W. and Lake Shore, and trains from all these roads will run over it.

The stocks of pig iron in the various yards of the brokers in this city aggregate 35,610 tons. Of this 10,990 tons are charcoal. Of the balance, 24,620 tons, not over 8000 tons is good mill iron, and a large part of this is out of the market at present prices.

Soho Furnace, 65x19, is making 550 tons per week of as good iron as ever was made in the city, one-half Missouri ore and the balance Lake Superior and cinder. The fuel is half Connellsville coke and half coke from Pittsburgh slack.

OHIO.

The Burgess Steel and Iron Works, at Portsmouth, having been imposed upon by various manufacturers, have changed the name of their German steel from "Burgess" to "Palmetto," and have copyrighted the latter name. Never having copyrighted the former name it was, of course, without protection. Their product is made from charcoal metals. They are at present running night and day. Very shortly new machinery will be ready at their works for the manufacture of their new 12 calk steel horse shoe. Steam hammers are being erected for the purpose of manufacturing tool steel.

The Novelty Iron Works, Cleveland, are building a 60 ton iron roof for the C. C. C. & I. Railroad Company to go to Brightwood, Indiana. They have also orders for six iron bridges to be delivered in June, which they will soon begin the construction of.—*Trade Journal.*

The Bellaire Nail Works have increased their capital stock to $500,000, the limits allowed by their charter.

The Baron Manufacturing Company, of Bellaire, the other day filled an order from St. Thomas, one of the West Indies, for glass ware.

The Ophir Furnace, Jackson county, has been purchased by Mr. H. S. Bundy.

The Blandys, of Zanesville, are seeking for a new place for their manufacturing establishment.

The managers of the Bellaire Glass Works have notified the blowers that wages will be reduced on next Monday.

At Steubenville both the Jefferson Furnaces are in blast and one of the Mingo. The Steubenville was banked up last week for repairs to the machinery, but is again in blast.

Wm. Ward has sold his interest in the Falcon Iron and Nail Works, at Niles, to Mr. John Grist, who takes Mr. Ward's place as president of the company. Mr. Robbins, the efficient secretary and treasurer, retains his position.

Brown, Bonnell & Co., of Youngstown, have their 3-high bar mill train in operation.

The Hecla Furnace, cold blast charcoal, blew out on the 10th inst.

The bridge house and drop of the Ohio Furnace were burned on Tuesday night of last week.

Lawrence Furnace, at Ironton, built originally as a charcoal furnace, is now running successfully on 40 per cent. of stone coal, which will be increased as soon as the roads are in a condition to haul coal.

The liabilities of Bancroft & Rader, owners of the Vinton Furnace, are stated to be $182,000, and their assets $68,000.

The Ironton *Register* has the following concerning the furnaces and mills of that neighborhood: Inquiries for metal have grown quite numerous since the 1st of January. Some parties have refused to sell iron at rates accepted only a few weeks ago. The Ætna Company have sold 3000 tons of Alice and about 400 tons of cold blast within the past two weeks. The Lawrence and Belfont mills are at work. The latter shipped 2000 kegs of nails South last Saturday. Bloom Furnace made 1650 tons of pig metal last blast, ending December 26, 1875. The furnace is for sale. For the past couple of weeks Belfont Furnace has been carrying 4800 pounds ore to 4350 pounds of coal.

The Forest City Pipe Company, Cleveland, have made an assignment to Theodore E. Burton.

A satisfactory arrangement having been made with the creditors of the Standard Iron Company, Cleveland, the works will be started up on or about the 1st of March.

Diebold, Norris & Co., of Canton, made an assignment some six weeks ago. The assets are now found to amount to about $325,000, or are of that value to the business. The liabilities are about $340,000. The present prospect is that the firm will be reorganized upon a new basis. The establishment will be sold by the assignees in the course of a few weeks. Manufacturing operations have not been interrupted, and it is not expected that it will be, work continuing with about 135 men at present. They are now completing unfinished work and working up material on hand. The works are fitted up with machinery of the latest patterns for turning out both burglar and fire-proof safes. The works are directly on the line of the Pittsburgh and Fort Wayne Railroad, and are sufficiently extensive to employ 500 when running full. Diebold, Norris & Co. had several safes in the recent heavy fire in this city. We saw one of these which was in the fire longest, and which was opened on Friday. Though the safe was very hot the papers were not injured, and perfectly legible. The safe was in the fire 56 hours. The manufacturing portion of the business will be continued by the same workmen as at present.

VIRGINIA.

The following furnaces in Wythe county are either in blast or active preparations are in progress to blow them in, viz., Barren Springs, Brown Hill, Raven Cliff, Speedwell and Panic.

The Panic Furnace, Gallagher & Co., went into blast last October, and made a short but successful run. Owing to some defect in the inwall it was blown out some weeks ago, but will start again in a few days.

Stocks of charcoal iron, as a general thing, are much lighter in this State this year than last. In Wythe county, for example, there are less than a 1000 tons, against 3000 a year ago.

MISSOURI.

The Vulcan Rail Mill, St. Louis, has started up rerolling old rails.

It is rumored that a party of Eastern capitalists are negotiating for a site near St. Louis, with a view to move some "old established Eastern lock factory" to that point.

The machinery for the new Bessemer plant of the Vulcan Mill, St. Louis, is rapidly approaching completion.

Among the great number of other processes for the disintegration of chrome ore which have

KENTUCKY.

The Hunnewell Furnace, at Greenupsburg, has just finished the first month of her new blast, averaging 17⅛ tons per day. Size, 46¾x11½.

The Centennial block of black band iron ore, intended for the International Exhibition, is now on its way to be classed among the minerals of Northeastern Kentucky. It is a splendid specimen, 15x30 inches, and weighing nearly seven hundred pounds.

ILLINOIS.

In speaking of the Meier Furnace, at Bessemer Station, in our last issue, the types made it say Mercer.

A New Method of Assaying Chrome Iron Ore.

A paper on this subject was read at the last meeting of the Chemical Section of the Philosophical Society of Glasgow by Professor Dittmar, of Anderson's University. What is claimed as new in Prof. Dittmar's method is the mode of disintegration, which is founded upon two facts which, in the opinion of the author, have not hitherto been known: (1) the fact that powdered chrome ore is easily dissolved not only (as everybody knows) by fused borax, but also by a ready made flux, obtained by fusing together borax with an excess of alkaline carbonate; and that (2) the mixture thus formed, when kept in a state of fusion in contact with air, readily absorbs oxygen, with conversion of the whole of the chromium into alkaline chromate.

The *modus operandi* which Prof. Dittmar has adopted is as follows: Two parts of borax glass are fused together with three parts of the mixture $NaKCO_3$ in a platinum crucible, until the eliminated carbonic acid is completely expelled, the mass poured out into a large platinum basin, allowed to cool, and bottled up for use. To disintegrate an ore, fuse one-half gramme of it with 5 to 6 grammes of the flux in a covered crucible over a Bunsen's lamp, and maintain a dull red heat for about five minutes. Now open the crucible, lay it slantingly on the triangle, and while maintaining the highest temperature attainable with a Bunsen's lamp, stir up the mixture with a platinum wire until the ore is completely dissolved. This being accomplished, continue heating the fused mass in presence of air for about half to three-quarters of an hour. Then allow to cool, digest the fused mass in water until it is completely disintegrated, heat on a water bath, with addition of a few drops of alcohol (to reduce any manganate that may be present), and after having evaporated away the alcohol, filter and wash the residue with hot water. The filtrate contains the whole of the chromium as chromate, which is most conveniently determined by an inversion of the well known process of Penny for the determination of ferrosum. The form in which the author prefers to execute this titration is to dissolve a known weight of metallic iron in hot dilute sulphuric acid, to cool down the solution as rapidly as possible, to add the previously acidified chromate, and then to titrate back with a standard solution of bichromate of potash.

Prof. Dittmar has applied this process a good many times and always found it to disintegrate the ore completely in one operation; and when applied repeatedly to identical samples, he found it to give perfectly constant results. He never saw two analyses of the same ore to differ from each other by more than 0·3 in the percentage of oxide of chromium. He has satisfied himself by special experiments that none of the chromium, which is once dissolved, remains unoxidized (*i. e.*, is obtained as chromite instead of chromate), and that the insoluble basic borates obtained in treating the fused mass with water, when dissolved in dilute sulphuric acid, yield a solution which is free from chromium. But this solution invariably contains something else, which, as the author never saw his crucibles visibly attacked through the fusion process, he did not expect to find, namely, a very appreciable quantity or platinic salt. It is on account of this constituent that it is not admissible to simplify the process by dissolving the whole of the fluid mass, *en bloc*, in dilute acid, and applying the titration process to this solution.

hitherto been proposed, there is only one, namely, the well known process of Dr. Clark, of Glasgow, which, like the author's, furnishes the chromium in a form in which it can be determined as it is, by titration. But there is one little difficulty in Dr. Clark's process which the author of the paper has not been able to overcome. It consists in this, namely—that it always leads to the formation of a brown substance, insoluble in water, which contains oxide of platinum, and which, if the sulphuric acid solution of the mass is subjected to titration, of course, oxidizes its equivalent of ferrosum, and thus leads to a positive error. This substance, it is true, can be removed by treatment of the mass with water and filtration. But, then, a small portion, at least, of the chromic acid remains behind with the basic oxides, and thus escapes determination. According to a few experiments which the author has made, this source of error can be avoided by substituting dry carbonate for the hydrate of soda in the disintegrating mixture. Only, in this case, according to his experience, it is scarcely possible to disintegrate an ore completely in one operation.

JULIEN CHURN AND Butter Worker.

Hardware and Agricultural Implement dealers are offered in the above an article that is now a staple in the trade, having been sold the past nine years from the Atlantic to the Pacific It is correct in principle, and manufactured in the most substantial and handsome manner.

Send for a Descriptive Circular.

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Steam, Blast, Vacuum and Hydraulic Gauges, Engine Counters, Pyrometers, Bar's Patent Governor, Steam Reducing Valves, etc. Sole Depot, W. HEUERMANN, 4 Cedar St., N. Y.

THE EXCELSIOR DRY LEVEL.—Patented.

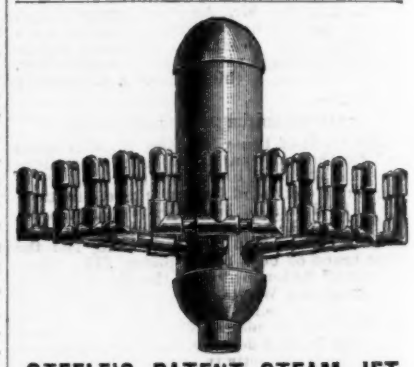
Works by gravity; warranted true; no glass to break; does not get out of order easily; graduated for degrees and feet and inches. Prices, $1·50 to $10, according to style and finish. For sale wholesale and retail by H. S. TARR & SON., 710 Green St., Phila.

TURPENTINE and ROSIN BARREL TRUSS HOOPS.

A large stock always on hand at lowest prices. Also full line of

Coopers' Tools For Turpentine Trade.

Send for prices to CHAS E. LITTLE, 59 Fulton St., N. Y.



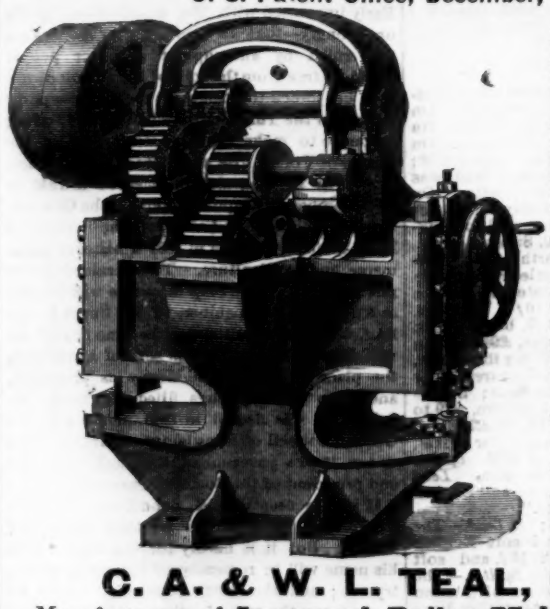
STEELE'S PATENT STEAM JET

For creating forced draft in Boiler Furnaces, Marine, Stationery or Locomotive. These Jets put in under the following stipulations: 30 days' trial given—if not satisfactory no charge or law suits.

Steamship, steamboat and factory smoke stacks warranted to draw 75 per cent. better. For further particulars apply to GEO. ST. FLE, Third Ave., bet. 139th & 140th Sts., N. Y. Or to *McNAB & HARLIN MFG. CO., 56 John Street, N. Y.*

TEAL'S IMPROVED COMBINED PUNCH & SHEAR

U. S. Patent Office, December, 1875.



The above cut represents a new pattern of *Combined Punch and Shear*. It is much smaller, more compact and lighter than any other machine to do the same work, in the market.

The Vibrators, which give the motion to the Punching and Shearing Heads, and which, as in other machines, have three surfaces exposed to great friction, are provided with an arrangement for taking up the wear, or lost motion; this can be done by the operator in a simple and easy manner, and will avoid the necessity of repairing.

The Die-seat, which holds the Dies is capable of very accurate adjustment with the Punch. For Boiler Makers, this machine will punch as small as a 12 in. diam. flanged boiler-head, and measures but 1½ in. from center of Punch to the end of machine.

The Punches have a vertical adjustment, which is a great advantage, as they become shortened by repeated grinding. The Punch "Stripper" can be adjusted to any thickness of iron.

This machine is adapted to all kinds of work, and will punch 1 inch hole in 1 inch iron, shear 1 inch plate, and cut off 1¼ inch bar iron.

C. A. & W. L. TEAL, Makers,

Manufacturers of Improved Boiler Makers Machinery.

320 Chestnut Street, PHILADELPHIA, PA.

We wish to call the special attention of merchants to this

PATENT

BRACKET SAW FRAME.

We have never before made anything which sold so readily, and gave such universal satisfaction.

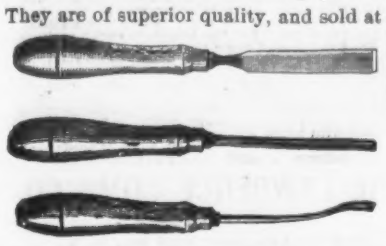
Where one is sold in a neighborhood, it makes a demand for many more. We have now sold 40,000 of them and have not yet heard one complaint, but we have a large number of letters expressing great satisfaction with them. We have advertised them largely and thereby created a demand in every part of the country.

The list price of Rosewood Frames is $1·25 each, and of Birch $1·00 each, with the same discount that we make on our Barber Bit Braces. Price of Saw Blades, $1·20 per gross net.

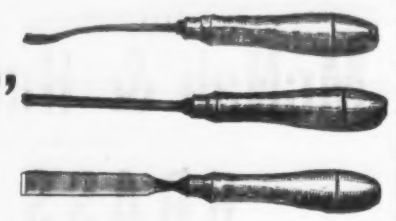
We also make sets of

CARVING TOOLS.

Price of the three tools in nice paper box $1·00, discount 25 per cent. to the trade. These tools are sharpened and fitted for work. They are of superior quality, and sold at a lower price than imported tools.



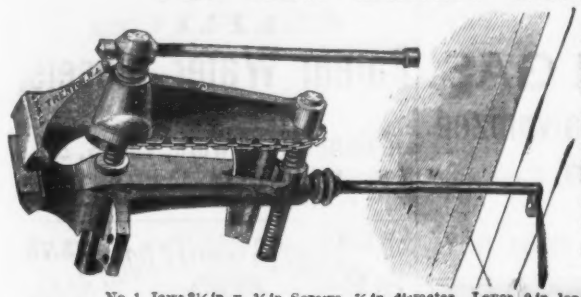
Millers Falls Co.,



No. 78 Beekman Street,

NEW YORK.

The New Double Screw Parallel "Leg" Vise.



We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is **stronger** than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which, depending upon slide alone for preserving parallelism, can never be screwed up very hard without "jamming" on the sides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now *warrant* these Vises for *three years* from date of manufacture stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steeled links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

No. 1, Jaws	3½	in. x	¾	in. Screws	⅝	in. diameter.	Lever	9	in. long,	Opens 4½ in. $8 00
" 2, "	4½	in. x 1	"	"	1	"	"	13	in. "	" 5¾ in. 12 00
" 3, "	5¼	in. x 1⅛	in.	"	1⅛	in.	"	16	in. "	" 6½ in. 17 00
" 4, "	6¼	in. x 1¼	in.	"	1¼	in.	"	19	in. "	" 7½ in. 22 00
" 5, "	7	in. x 1⅜	in.	"	1⅜	in.	"	24	in. "	" 9 in. 30 00
" 6, "	8	in. x 1½	in.	"	1⅝	in.	"	28	in. "	" 10 in. 34 00

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of $1 to $3. Sold at the General Agencies.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MFG. CO.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE. Louisville.—Messrs. W. B. BELKNAP & CO.

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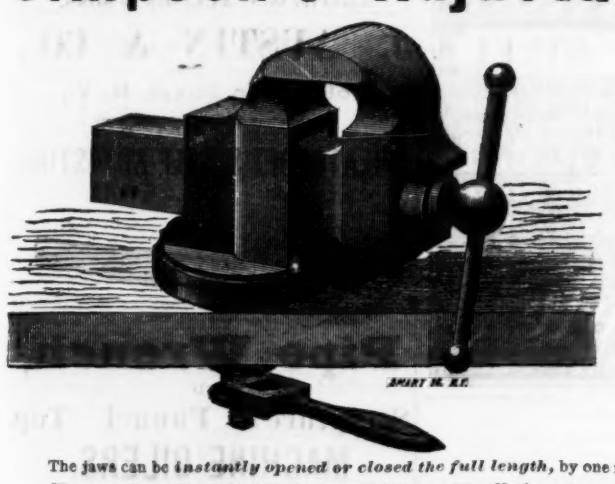
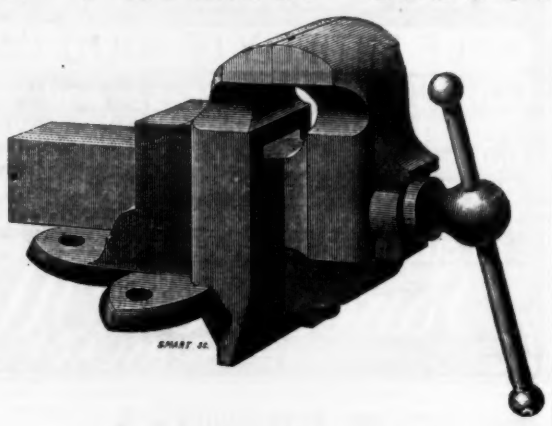
Simpson's Adjustable Parallel Vises.

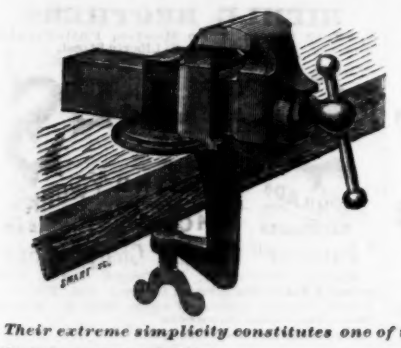


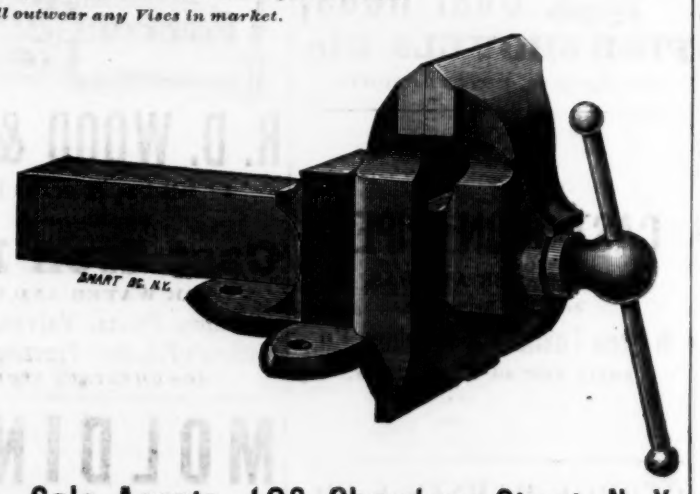


The jaws can be *instantly opened or closed the full length,* by one movement of the hand, *without the use of the screw.*

They combine the QUICK ADJUSTMENT with all the advantages of the best Screw Vises, holding the work with as *slight* or *firm* a grip as may be desired, *without any liability to jar or work loose, as is the case with other adjustable vises.*

The Screw being used merely to give the grip, they will outwear any Vises in market.





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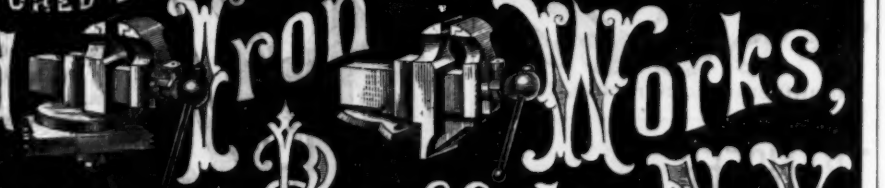

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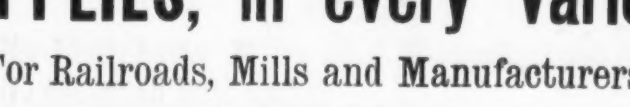

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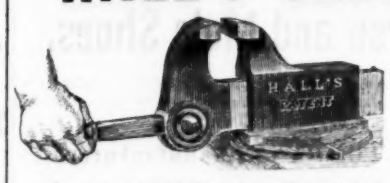

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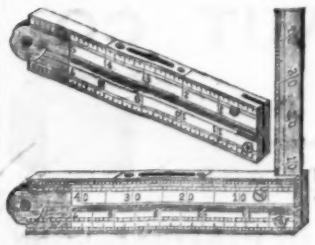

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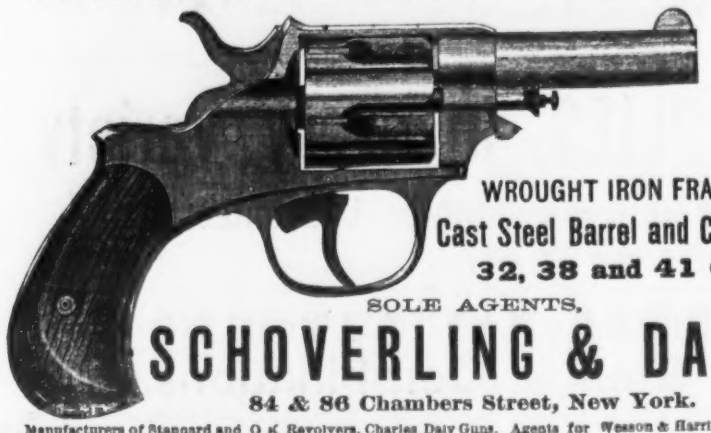

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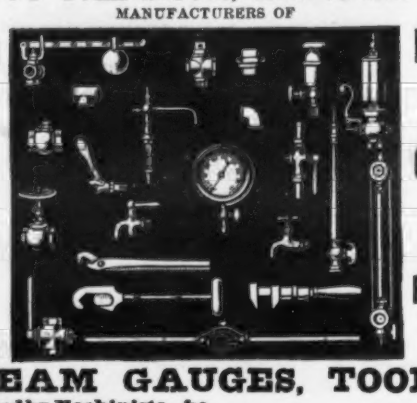

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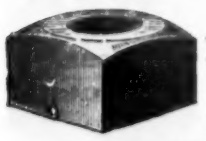

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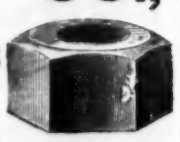

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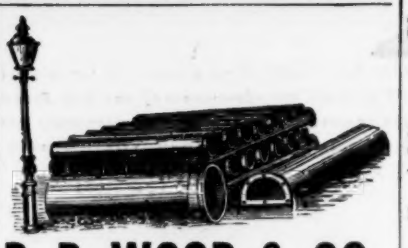

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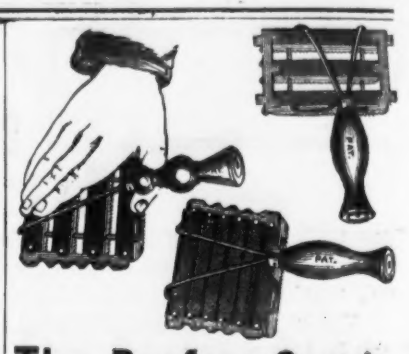

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Engravers.
Collins, Geo. B. 19 Warren, N. Y. 13

Faucets, Brass, *Makers of.*
McNab & Harlin Mfg. Co., 55 John, N. Y. 25

Faucets, *Self-Measuring, Makers of*
Enterprise Mfg. Co., of Pa., Phila. and N. Y. 34

Files, *Importers of.*
Carr J. & Riley 82 John, N. Y. 32
Fisher Joseph & Son, 411 Commerce, Phila. 11
Fraser Peter A. & Co. 25 Fulton, N. Y. 8
Moss F. W., 80 John, N. Y. 32
Sanderson Bros. & Co., 16 Cliff, N. Y. 32
Spear & Jackson, 118 Duane, N. Y. 33

Files, *Manufacturers of.*
Adamantine File Works, Providence, R. I. 13
American File Co., Pawtucket, R. I. 8

Auburn File Works, 89 Chambers, N. Y. 8
Barnett G. & H., 41 and 43 Richmond, Phila. 8
Draper C. F. & Co., Sing Sing, N. Y. 8
Heller & Bros. Newark, N. J. 8
Hiscox File Mfg Co. Lowell, Mass. 36
Johnson & Bro., 1 Commercial, Newark, N. J. 8
McCaffrey & Bro., 1732 and 1734 N. 4th, Phila. 8
Nicholson File Co., Providence, R. I. 28
Paul Chas. B., Williamsburgh, N. Y. 8
Walsh, Coulter & Flagler, 83 Chambers, N. Y. 8

Fire Brick. *Makers of.*
Anness Chas. & Sons, Woodbridge, N. J. 28
Berry Wm. H. & Co., Woodbridge, N. J. 28
Brooklyn Clay Retort and Fire Brick Works, Van Dyke, St., Brooklyn, N. Y. 28
Bell & Bacon, Troy N. Y. 28
Hall A. & Sons, Perth Amboy, N. J. 28
Hall A. & Sons, Buffalo, N. Y. 28
Maurer Henry, 418 East 23d, N. Y. 28
Kreischer B. & Son, 58 Goerck, N. Y. 28
Newkumet Philip, 23d and Vine, Phila. 28
Newton & Co., Albany, N. Y. 28
Valentine M. D. & Bro., Woodbridge, N. J. 28
Watson John R., Perth Amboy, N. J. 28
Weber Adam, 1633 E. 15th, N. Y. 28

Flint and Emery Paper and Cloth.
Baeder, Adamson & Co. 730 Market, Phila. 18

Flue Cleaners. *Makers of*
The Chalmers Spence Co., foot of E. 9th, N. Y. 22

Forges, Portable, etc.
Empire Portable Forge Co., Troy, N. Y. 36
Place George, (Hurricane) 121 Chambers, N. Y. 9

Forgings.
Johnson J. B., Richmond Va. 37

Founders and Machinists.
Saml. J. Cresswell Jr., 812 Race, Phila., Pa. 6

Foundry Facings.
Walsh J. P., 121 Chambers, N. Y. 4

Furnaces *Makers of*
Richmond & Potts, 119 S. Fourth, Phila., Pa. 5

Galvanized Iron.
Lefferts Marshall Jr., 90 Beekman, N. Y. 4

Gas Fixtures. *Makers of.*
Bradley & Hubbard Mfg. Co., 21 & 23 Barclay, N. Y. 40

Gong Bells. *Makers of*
Edw. Sweeney, 4 Duane, N. Y. 18

Governors.
Hartford Governor Co., Hartford, Ct. 39
Huntoon Governor Co., Lawrence, Mass. 40
Junius Judson & Son, Rochester, N. Y. 26
Shive Governor Co., Bethlehem, Pa. 38

Grate Bars.
Vanderbilt Geo., foot W. 19, N. Y. 4

Grindstones.
Wood Walter R., 283 and 285 Front, N. Y. 37
Worthington & Sons, North Amherst, O. 37

Guns, &c
Schoverling & Daly, 84 Chamber St. 26
Windmuller Louis & Roelker, 20 Reade N. Y. 20

Gunpowder. *Makers of.*
Kneeland F. L. (Dupont) 70 Wall, N. Y. 32
Laflin & Rand Powder Co. 21 Park Row, N. Y. 33

Hammers, etc., *Manufacturers of.*
Emmet Hammer Co., Brooklyn, E. D., N. Y. 13
Hammond H., Hartford, Ct. 36

Handles, *Makers of*
N. Carolina Handle Co., 79 Reade, N. Y. 6
Greensboro' Handle Works, 103 Chambers, N. Y. 6

Hardware Commission Merchants.
Graham & Haines, 85 Chambers, N. Y. 34
Keith Edward M., Baltimore, Md. 33
Peck G. Warner, 16 Chambers, N. Y. 8
Walbridge G. B. & Co. 99 Chambers, N. Y. 31
Walsh, Coulter & Flagler, 83 Chambers, N. Y. 8
Wilson J. Clark & Co., 81 Beekman N. Y. 10

Hardware Dealers.
Betts & Burger, 95 Chambers, N. Y. 18
Lloyd, Supplee & Walton, 625 Market, Phila. 34
Quackenbush, Townsend & Co., 59 Reade, N. Y. 34
Shepard Sidney & Co., Buffalo N. Y. 31
Wilson J. Clark & Co., 81 Beekman, N. Y. 10

Hardware Importers.
Baker Hermann & Co., 101 Duane, N. Y. 33
Field Alfred & Co. 93 Chambers, N. Y. 33
King, Briggs & Co., 80 Chambers, N. Y. 11
Van Wart & McCoy, 134 and 136 Duane, N. Y. 10
Turnor R. A., 78 Chambers, N. Y. 11
Windmuller Louis & Roelker 20 Reade N. Y. 20

Hardware Manufacturers.
American Spiral Spring Butt Co., 82 Beekman, N. Y. 40
Barnett Oscar, Newark N. J. 9
Cowles Hardware Co., Unionville, Ct. 9
Enterprise Mfg. Co., Phila. 34
Hart, Bliven & Mead Mfg. Co., 243 Pearl N. Y. 34
Ives, Woodruff & Co., Mount Carmel, Conn. 33
Middletown Tool Co., 18 & 20 Cliff, N. Y. 36
Miller's Falls Mfg. Co., 78 Beekman, N. Y. 25
Pratt & Co., Buffalo, N. Y. 31
Providence Tool Co., Providence, R. I. 13
Schweitzer Mfg. Co., 57 Reade, N. Y. 18
The Hull & Belden Co., Danbury, Conn. 40
Phelan Edward, 113 Chambers, N. Y. 36
Union Mfg. Co. 99 Chambers, N. Y. 7
Van Wagoner & Williams 82 Beekman, N. Y. 40
Wilson Mfg. Co., 97 Chambers, N. Y. 39

Hardware Specialties.
American Mfg. Co., New Haven, Conn. 6
Bevington & Northan Rochelle, Ills. 11
Erling P. R. & Co., Milwaukee, Wis. 5
Grant & Co., Newark, N. J. 27
Hardy & Co., 102 Elm, N. Y. 6
Langdon Mitre Box Co., Millers Falls, Mass. 12
Post C. C., Burlington, Vt. 28
Shepard Sidney & Co., Buffalo, N. Y. 31
Washburn B. D. & Co., Boston, Mass. 10

Hoes, *Maker of.*
Hicks O. H. & Co., Baltimore, Md. 34

Hog Ringers.
Blair E., Bucyrus, O. 10

Hoisting Engines. *Makers of.*
Crane Bros. Mfg. Co., Chicago, Ill. 9
Otis Bros. & Co., 348 Broadway, N. Y. 9

Horse Hay Forks and Fixtures, *Makers of.*
Nellis A. J. & Co., Pittsburgh, Pa. 40

Horse Nails. *Makers of.*
Ausable Horse Nail Co. 35 Chambers, N. Y. 34
Globe Nail Co., Boston, Mass. 34
Platt & Co., Buffalo, N. Y. 31
Putnam S. S. & Co., Neponset, Mass. 8

Horse Shoes, *Makers of.*
Burden Iron Works, Troy, N. Y. 4
Rhode Island Horse Shoe Co., Providence, R. I., 7
Schoenberger & Co., Pittsburgh, Pa. 4
Semple, Birge & Co., St, Louis 36

Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y. 39

Ice Chisels.
Holden E. J. & Co., 54 Beekman, N. Y. 6

Insurance, Boiler.
Hartford Steam Boiler Inspection and Insurance Co. 39

Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y. 4
Coleman & Bro., Louisville, Ky. 4
Crane U. O., 104 John, N. Y. 4
Hatry A. G., Pittsburgh, Pa. 4
Hazard T. D. 204 Pearl, N. Y. 4
Smith W. Minor, 95 Beaver, N. Y. 4

Iron Bridges.
Leighton Bridge and Iron Works, Rochester, N. Y. 18

Iron, Charcoal, *Warm or Cold Blast,*
Quincy John W., 96 William, N. Y. 4

Iron Commission Merchants.
Carpenter J. O., 104 John, N. Y. 4
Justice Cox Jr. & Co., 383 Walnut, Phila. 5
Hand Jas. C. & Co., 614 and 616 Market, Phila. 6
Main Bros., 228 Dock, Phila. 5
Spooner & Collins, St. Louis, Mo. 4

Iron Railing.
Vreeland D., 148 W. 38, N. Y. 4

Iron, Pig, *Importers of.*
Williamson James & Co., 69 Wall, N. Y. 4

Iron Pig, *Manufacturers of*
Parrott Peter P., Greenwood Fce., Orange co., N. Y. 4

Iron Dealers.
Abeel Brothers, 190 South, N. Y. 4
Bonnell, Botsford & Co., Youngstown, O. 4
Borden & Lovell, 70 and 71 West, N. Y. 4
Cleveland, Brown & Co., Cleveland, O. 6
Cooney Daniel F., 88 Washington, N. Y. 4
Buerstel G., 99 Market Slip, N. Y. 4
Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Fuller, Dana & Fitz, 110 North, Boston 2
Wm. Gardner's Sons, 575 Grand, N. Y. 4
Harrison & Gilloon, 558 to 562 Water, N. Y. 4
Holden, Hopkins & Stokes, 104 Jona, N. Y. 4
Jackson & Chase, 206 and 208 Franklin, N. Y. 4
Judson B. F., 457 and 459 Water, N. Y. 4
Matthews Chas. W., 133 Walnut, Phila. 5
Ogden Wallace, 85, 87, 89 and 91 Elm, N. Y. 4
Pierson & Co., 24 Broadway, N. Y. 4
Quincy John W., 96 William, N. Y. 4
Reed John H. & Co. 6
Richards D. W. & Co., 92 Mangin St., N. Y. 4
Snyder Asa, Richmond, Va. 4
Wallace Wm. H. & Co., Albany and Washington streets, N. Y. 4
Warner A. B. & Sons, 28 and 29 West, N. Y. 4
Williamson James & Co., 69 Wall, N. Y. 4
Whitney A. R. & Bro., 58 Hudson N. Y. 4

Iron, *Manufacturers of.*
Bradley, Reis & Co., 23 Cliff, N. Y. 4
Britannia Iron Works, Middlesbro', Eng. 6
Burden Iron Works, Troy, N. Y. 4
Cleveland Rolling Mill Co., Clevelane, O. 6
Conn Wm. E. & Co., 8 Oliver, Boston. 4
Boston Rolling Mills, 17 Batterymarch, Boston. 4
Everson, Macrum & Co., Pittsburgh, Pa. 4
J. & J. Rogers Iron Co. Ausable Forks, N. Y. 5
Lackawanna Iron and Coal Co., Scranton, Pa. 5
Leonard John, 450 & 451 West st. N. Y. 4
Milwaukee Iron Co., Milwaukee, Wis. 6
Old Dominion Iron & Nail Works Co., Richmond, Va. 5
Oxford Iron Co., 51 Washington, N. Y. 4
Phœnix Iron Co., 410 Walnut, Phila. 5
Rowland Wm. & Harvey, Phila. 40
Shoenberger & Co., Pittsburgh, Pa. 4

Iron, Pinnished Sheet *Manufacturers of*
Wood W. D. & Co., Pittsburgh, Pa.

Iron, Swedish, *Importers of.*
Fuller, Dana & Fitz, Boston, Mass. 2
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Mitander Nils, 69 William, N. Y. 4

Japanned Tin Ware.
Jewett John C. & Sons, Buffalo, N. Y. 18

Keys and Cutters, *Manufacturers of.*
Barnes Geo. & Co., Syracuse, N. Y. 36

Lanterns, *Manufacturers of.*
Dietz R. E., (Tubular) 54 and 56 Fulton, N. Y. 40
Howard & Morse 45 Fulton, N. Y. 2

Lead Pipe, &c., *Manufacturers of.*
Bayley, Farrell & Co., Pittsburgh, Pa. 2

Levels
Tarr H. S. & Son, 710 Green, Phila. 34
Heuermann W., 4 Cedar, N. Y. 24

Locks, *Manufacturers of*
American Lock Mfg. Co., Canenovia, N. Y. 13
Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D. 13
D. R. Miller Lock Co., 312 Cherry, Philadelphia.
Romer & Co., Newark, N. J. 9
Union Nut Co., 78 Beekman, N. Y. 38
Yale Lock Mfg. Co., 296 Broadway, N. Y. 36

Lubricators. (Patent) *Maker of.*
Crossley H., Brooklyn, N. Y. 39

Machinery, *Makers of.*
Hendey Machine Co., Wolcottsville, Ct. 28
Pratt & Whitney Co., Hartford, Conn. 35
Sellers Wm. & Co., 1600 Hamilton Phila. 39
The Hull & Belden Co., Danbury, Conn. 40
Walker Joseph, 915 Market, Phila., Pa. 38
Wetherill Robert & Co., Chester, Pa. 28
Wood Thomas 2106 Wood, Phila. 39

Machine Screws, *Makers of.*
Boone W. C., 18 Humboldt, Brooklyn, E. D. 12
Ducreux C., 98 Elizabeth, N. Y. 12
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. 12

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester Mass. 38
Harrington Edwin, & Son, 15th st. and Pa. ave., Phila. 9
Jones, Lamson & Co., Windsor, Vt. 38
Le Count C. W., South Norwalk, Conn. 39
Raiser Louis, 128 Worth, N. Y. 15
Van Haagen C. & Co., Phila., Pa. 24
Wiley & Russell Mfg. Co., Greenfield, Mass. 40

Malleable Articles. *Maker of.*
Hammer & Co., Branford, Ct. 10

Measuring Tapes.
Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N. Y. 32

Meta Dealers and Brokers.
Coddington T. B. & Co., 25 and 27 Cliff, N. Y. 2
Crane C. O., 104 John, N. Y. 4
Fuller, Dana & Fitz, Boston, Mass. 2
Gregg H. L. Co., 108 Walnut, Phila. 5
Lefferts J. C., 241 Pearl, N. Y. 4
W. J. Hammond, Pittsburgh, Pa. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. 20
Quincy J. W., 96 William, N. Y. 2
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago 8
Thomson A. A. & Co., 213 Water, N. Y. 2
Van Wart & McCoy, 134 and 136 Duane N. Y. 2

Metallurgists.
Britton J. Blodgett 339 Walnut, Phila. 6
Hart Edward, Easton, Pa. 6
Wallace & Humphrey, 113 Walnut, Phila. 6

Metal Roofing.
Hickcox Mfg. Co., 280 Pearl N. Y. 4

Metal Oil Cloth Binding.
Eaton Geo. S., First st., cor. N, 3d st., Brooklyn, E. D., N. Y. 32

Meat Chopping Machinery.
Murray Iron Works, Burlington, Iowa. 13

Miners' Candles. *Makers of*
James Boyd's Sons, 10 and 12 Franklin, N. Y. 26

Mining Spikes
Roseberry Geo. D., Pottsville, Pa. 4

Molders' Tools.
Carter H. 290 Pearl, N. Y. 8

Molding Machines, *Makers of*
Hammer T. F., Branford, Conn. 26

Mouse Traps, Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 40

Nails.
Schoenberger & Co., Pittsburgh, Pa. 4

Nail Pullers.
Maltby, Curtiss & Co., 84 Reade, N. Y. 11

Nickel Platers.
Colt A. T., 47 Beekman, N. Y. 27
Continental Nickel Plating Works, 47 Ann, N. Y. 27
Hartman John, 3714 N. Seventh, Philadelphia. 2
Manhattan Nickel Works, 180 and 182 Center, N. Y. 27
New York Nickel Plating Co, 138 West 25th, N. Y. 27
Owen S. S. & Co., 121 E. 13, N. Y. 27
Roehrig, Fred Wm., 217 Center, N. Y. 27
Wicks & Co., 79 First st., Brooklyn, E. D., N. Y. 27
Wilger & Co., 114 Fulton, N. Y. 27

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila. 40

Note Broker.
Gallaudet F. W. 3 and 5 Wall, N. Y. 4

Nuts, Bolts, etc., *Makers of.*
American Bolt Co., 210 Lawrence, Lowell, Mass. 13
Clark Bros. & Co., Middle, Conn. 12
Ely & Co. 113 Chambers, N. Y. 4
Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Haskell W. H. & Co., Pawtucket, R. I. 13
Hoopes & Townsend, 1530 Buttonwood, Phila. 12
Lewis, Oliver & Phillips, Philadelphia, Pa. 13
New Haven Nut Co., Westville, Ct. 6
Roseberry Geo. D., Pottsville, Pa. 4
Russell, Birdsall & Ward, Port Chester, N. Y. 40
Shelton Co., Birmingham, Conn. 34
Sternbergh J. H., Reading, Pa. 13
Union Nut Co., 78 Beekman N. Y. 38

Oil Cook Stoves.
Riessner A., 160 William, N. Y. 18

Oil Lubricating, *Makers of*
Lester Oil Co., 163 Water, N. Y. 37

Oil Stones, *Makers of.*
Boyd & Chase, 107th street and 1st avenue, N. Y. 37

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia. 5

Ore Crushers.
Blake Crusher Co., New Haven Ct. 36

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.

Patent Solicitors.
A. V. Briesen, 268 Broadway, N. Y. 20
Burke & Fraser, 37 Park Row, N. Y. 28
Cox & Cox, 229 Broadway, N. Y. 28
Howson & Son, Phila. and Washington, D. C. 28
Lehmann F. A., Washington, D. C. 24
Munn & Co., *Scientific American* 37 Park Row N. Y. 36
Nye Francis C., 43 Murray, N. Y. 28
Simonds W. E., Hartford, Ct. 24
Spencer A. H., 28 State Boston, Mass. 28
Stetson T. D., 23 Murray, N. Y. 25

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. 2

Pipes, Fittings, etc., *Makers of.*
Eaton, Cole & Burnham Co., 58 John, N. Y. 26
Meyer Henry C. & Co., 48 Cliff, N. Y. 40
McNab & Harlin Mfg. Co., 55 John, N. Y. 26
Pancoast & Maule, 227 Pear, Phila. 26

Pipe, Water and Gas, *Makers of.*
Barr Edward, 78 John, N. Y. 26
Leighton Bridge and Iron Works, Rochester, N. Y. 18
McNeal John & Sons, Burlington, N. J. 6
National Tube Works Co., 78 William, N. Y. 26
Warren Foundry & Mach. Co., Phillipsburg, N. J. 6
Wood R. D. & Co., 400 Chesnut, Phila. 26

Plane Irons, *Manufacturer of*
Buck Bros., Millbury, Mass. 3
Mack & Co., Rochester, N. Y. 25
Middletown Tool Co., 18 & 20 Cliff, N. Y. 6

Planes, *Manufacturers of.*
Greenfield Tool Co., Greenfield, Mass. 10
Mack & Co., Rochester, N. Y. 25
Stanley Rule & Level Co., 35 Chambers, N. Y. 25

Plated Ware
Derby Silver Co., Derby, Ct. 40
Hall, Elton & Co., 75 Chambers, N. Y. 10
Rogers & Bros., 203 Broadway, N. Y.
Reed & Barton 2 Maiden Lane, N. Y. 33

Plows, Chilled Iron *Makers of.*
South Bend Iron Works, South Bend Ind. 13

Plumbage Lubricator.
Joseph Dixon Crucible Co., Jersey City, N. J. 40

Plumbers' Materials, *Manufacturers of*
Baltimore Bell and Brass Works, 53 and 55 Holliday, Baltimore, Md. 12
Everhart Jas. M., Scranton, Pa. 40
Redfield, Bowen & Walworth Co., Chicago, Ill. 40
Carr Wm. S. & Co. 106 Centre, N. Y. 26

Presses, Power. *Makers of.*
Boomer & Boschert Press Co., Syracuse, N. Y. and 26 Beekman, N. Y. 28
Merriman A. H., West Meriden, Ct. 34
The Stiles & Parker Press Co., Middletown, Ct. 36
Peck Milo, New Haven, Conn. 38

Pressure Blowers. *Makers of.*
Wild R. W., 20 Cortlandt, N. Y. 33

Printing Presses.
Kelsey & Co., Meriden, Conn. 40

Pumps, *Makers of.*
Clayton Jas. 11 Water, Brooklyn, N. Y. 9
Douglas W. & B., Middletown, Conn. 7
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 99 Chambers, N. Y. 7

Pyrometers.
Brown Edward, 311 Walnut, Phila.

Railroad and Mining Tools.
Metcalf, Paul & Co., Pittsburgh, Pa. 37

Railroad supplies.
Duyckinck W. C., 50 and 52 John, N. Y. 18
Jackson & Tyler, Baltimore, Md. 37
Rogers H. A., 19 John, N. Y. 25

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
Griswold John A. & Co., Troy, N. Y. 33
Lackawanna Iron and Coal Co., Scranton, Pa. 5

Razor Straps, *Makers of.*
G. F. Badger & Son Charlestown, Mass. 26

Refrigerators.
Jewett John C. & Sons, Buffalo, N. Y. 10

Rivets.
Timme's Son Peter, 281 North 6th, Brooklyn, E. D. 4

Road Scrapers &c., *Makers of.*
Revolving Scraper Co., Columbus, O.

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore James, Cor 16th and Buttonwood, Phila. 36

Rules, *Manufacturers of.*
Stanley Rule and Level Co., 35 Chambers St. 25
Stephens & Co., Riverton, Ct. 25

Saddlery Hardware, *Makers of*
Sargeant Mfg. Co., Newark, N. J. 12

Sad Irons, *Makers of*
Brooklyn Sad Iron Co., Brooklyn, E. D., N. Y. 33

Safe Deposit Co.
Penna. Warehousing & Safe Deposit Co., Front and Lombard, Philadelphia. 26

Sand and Emery Paper, *Makers of*
Baeder, Adamson & Co., 730 Market, Phila. 5

Sash Locks *Makers of.*
Hammond W. S., Lewisberry, Pa. 25

Saws, *Makers of.*
American Saw Co., Trenton, N. J. 10
Atkins E. C. & Co., Indianapolis, Ind. 10
Boynton E. M., 80 Beekman N. Y. 17
Disston Henry & Sons Phila. 29
Peace Harvey W., Williamsburg, N. Y. 10
Spear & Jackson, 100 Chambers, N. Y. 33
Wheeler, Madden & Clemson M'g. Co., Middletown, N. Y. 10

Saw Frames, Wood, *Makers of.*
Boynton E. M., 80 Beekman, N. Y. 17
Peace Harvey W., Williamsburg, N. Y. 10

Scales, *Manufacturers of.*
Chattillon John & Sons, 91 Cliff, N. Y. 9
Fuenie Bros., 9th near Coates, Phila. 26
Shive Governor Co., Bethlehem, Pa. 38

Screws, *Makers of.*
Miles F. S., 206 Quarry, Phila. 12

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 9
Fleig Aifred & Co., 96 Chambers, N. Y. 40
Guenzel George & Son, 39 W. 4th, N. Y. 10

Scythe Snaths.
Vermont Snath Co., 90 Chambers, N. Y. 6

Seamless Tubes. *Makers of*
Merchant & Co., Phila., Pa. 3

Shovels, &c.
Clement & Hawks Mfg. Co., Northampton, Mass. 12
Middlenoro Shovel Co., 63 Oliver, Boston. 12

Sheet Metal Workers.
East River S. M. Mfg. Co., 206 Water, N. Y. 38

Shears, Scissors &c.
Marx Bros., 439 B'way, N. Y. 11
Rvals Jas., Collinsville, Ct. 11

Shutters, Self Coiling, *makers of*
Clark & Co., 218 W. 26th st. 3

Sieves.
Mann R. J. & Co., St. Louis, Mo. 27

Smelting Works.
Hooks Smelting Co., Phila., Pa. 3
Reeves Paul S., 760 South Broad St. Phila. 40

Stamped and Japanned Tin Ware.
Shepard Sidney & Co., Buffalo, N. Y. 31
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago. 8

Steam Hammers, etc., *Makers of.*
Bradley Mfg. Co., Syracuse, N. Y. 33
Dudgeon Richard, 24 Columbia, N. Y. 36

Steam Jets.
Steele Geo., 3d ave., between 139 and 140, N. Y. 24

Stencils, *Manufacturers of*
Stafford Mfg. Co., 66 Fulton, N. Y. 25

Snaps, Harness. *Makers of.*
Hold Back and Snap Co., Troy, N. Y. 34
Middletown Tool Co., 18 & 20 Cliff, N. Y. 36

Spikes, R. R. &c., *Manufacturers of*
Fahrion, G. W. Warren, Ohio. 5

Spoons.
Kann & Sons Mfg. Co., Baltimore, Md. 11

Philadelphia Fire Brick
AND
Clay Retort Works,
AND KENSINGTON FIRE BRICK WORKS
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PHILIP NEWKUMET,
Successors to JOHN NEWKUMET, Proprietor manufactures 9-inch Fire Bricks, Tiles, and Blocks for Rolling Mills, Blast Furnaces, Foundries Gas Works, Lime Kilns, Glass Houses, &c., &c
Articles of every description made to order short notice, and in a very superior manner.
"CLAY RETORTS FOR SUGAR HOUSES."

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STATEN ISLAND
CLAY RETORT WORKS,
Established 1845.
Office, 58 Goerck Street, cor. Delancy Street,
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The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.
Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand from my own mines at New Jersey and Staten Island by the cargo or otherwise.

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Manufacturers of all forms and sizes of FIRE BRICK, for Blast Furnaces, Rolling Mills, Gas House and Oven Tiles, and Stove Linings, made to order. Also, Fire Clay, Kaolin, Sand and Fire Mortar.

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BRICK PRESSES,
For Fire and Red Brick,
PATENT STEAM GEARING
For grinding Clay for Red or Fire Brick, and a kinds of Brick Machines in general.
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F. L. & D. R. CARNELL,
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Manufacturers of Pennsylvania Brick Machine Little Giant Pipe Machine, Fire and Red Brick Presses, Clay Wheels, Tile Machines, Stampers, Grinding Pans. Brick Yards fitted out for running by steam or horse. Heavy and Light Castings. Send for circular.

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Having established himself in the Iron and Machine Business in Water St., Perth Amboy, is now prepared to execute all orders in machinery, such as STEAM ENGINES, BRICK MACHINES, BRICK PRESSES AND TILING MACHINERY. Also, Steam Fitting, and Iron and Brass Castings, &c., furnished in the shortest time, and in the best and most workmanlike manner.

The Sugar Maker's Friend.

PRICE, $4.50 per hundred.
More agents wanted to canvass for the sale of Post's Patent Galvanized Malleable Eureka Sap Spout and Bucket Hanger. Samples, Circulars and Terms sent on receipt of 20cts to pay postage. Address,
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Send 50 cents for 6 samples (Prepaid) of
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For supporting and locking upper and lower sashes of all windows. Not a coiled spring, but one *forged* from best materials. W. S. HAMMOND,
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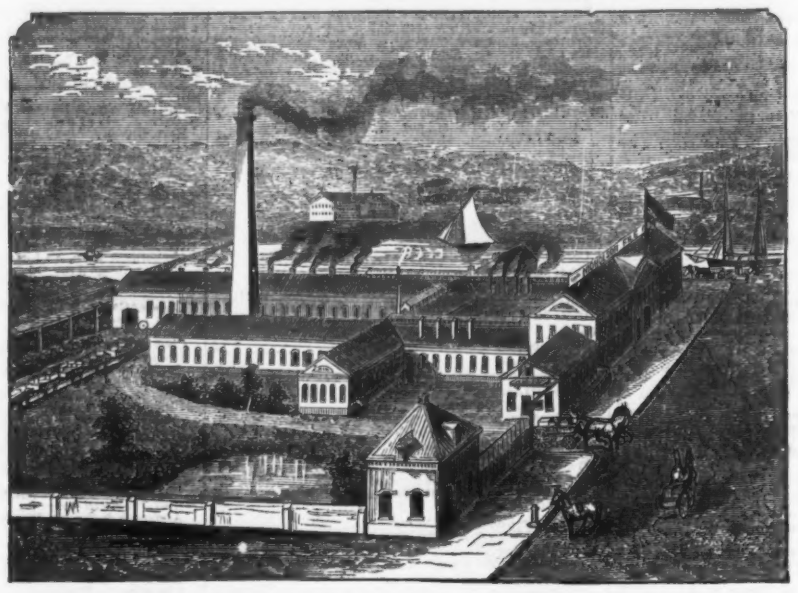

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Fourth.—They **will finish finer** than Files of any other make of same degree of coarseness.

Fifth.—They **will not "pin"** or scratch like hand-cut Files.

Sixth.—The **"Increment cut"** File, by our records, **will remove more stock with a given number of pounds applied** than any other File with which we are acquainted

Seventh.—All Files under seven inches are **put up in boxes** of one dozen each, and neatly labeled.

Eighth.—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

Ninth.—We are constantly making careful tests of our Files by delicately constructed machinery, which **automatically records** the **actual power applied,** forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the **quality of our Steel for wear,** but **also of the cutting qualities** of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

Finally.—Our Files **are warranted** to be **hard, well cut** and **sound.** They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of **our ability to furnish a good article cheap,** is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

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MANUFACTURERS OF
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All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.
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ESTABLISHED 1836,
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Manufacturer of
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A. HALL & SONS, Perth Amboy, N. J.
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FIRE BRICK
of reliable quality for all purposes, manufactured of the best New Jersey Fire Clays. Also, ROCKINGHAM WARE, YELLOW WARE, Fire Clay, Fire Sand, Kaolin Ground Fire Brick, and Diamantine Building Brick.

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Keystone Saw, Tool, Steel and File Works.

HENRY DISSTON & SONS,

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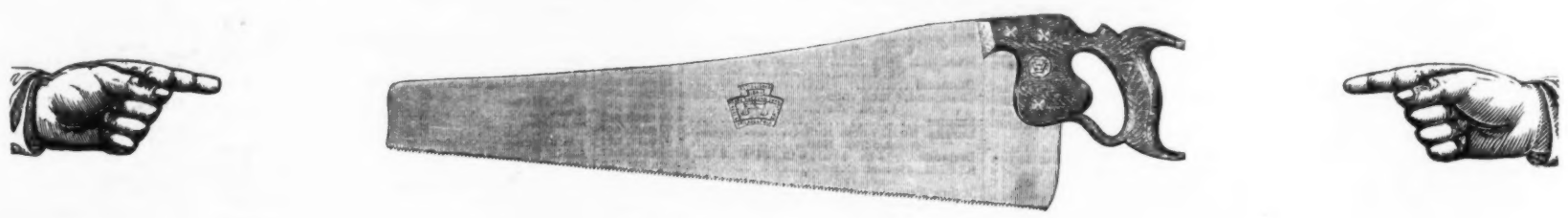
"CENTENNIAL No. 76."



This Saw is ground on the back, to taper gradually from butt to point, being only 26 gauge at the point. By this mode of grinding, the Saw, when tested, makes a complete "whip bend." The handle is apple-wood, oil finish, the screws are flush and polished, and the Saw is superior to any ever offered to the trade in this or any other country at the price. It is the sweetest-cutting, nicest-hanging Saw that can possibly be manufactured, feeling as light as a feather at the point, owing to its peculiar construction. The screws are finished before being put into the handle, and, should they become loose, can be readily tightened with an ordinary screw-driver, and still make a good finish.

SPECIAL NOTICE.

In introducing our "CENTENNIAL NO. 76" Hand Saw to the Hardware trade, we take this occasion to say to any of our customers who purchase these goods, that if they do not prove entirely satisfactory, we will take them off their hands at our expense.

New York Wholesale Prices, February 16, 1876.

HARDWARE.

Anvils.
Wright's.....₩ ℔ gold 10¾c; over 250 ℔s 11c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₩ ℔ gold 11c
Eagle Anvils (American).....₩ ℔ 10c dis 20 %

Apple Parers.
Domestic, Turn Table, Lightning, Hudson's, Reading, Union, Skeleton Paring, Coring and Slicing.....$4 00 ₩ doz net
Bay State, Paring, Coring and Slicing.....$15 00 dis 10 %
Climax Slicer.....8 00

Ash Sifters.
J. E. Corning's Barrel Head.....dis 10 %
Rival.....₩ doz $12 00 net
Square.....per doz $2 50 dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co., Douglass, Ives, Beecher, French, Swift & Co., Griswold, Challenge.....1st quality.....dis 40&10 %
Nobles Mfg. Co.....dis 40 &10 %
Cook's.....dis 40&10 %
Diamond Hardware Co.....dis 25&10&10 %
Snell Mfg. Co.....dis 25 %
Jennings' Bits.....dis 10 %
Lewis' Single Twist Bits.....dis 25 %
Andrews' Bits.....dis 25 %
Griswold's Patent Bits.....dis 30 %
Expansive Bits, Clark's....small, $18; large, $26—dis 15 %
" " Ives'.....$30 @ $36—dis 30 %
" " Blake's.....$30—dis 40 %
Hollow Augers, Douglass', Ives', French, Swift & Co.....dis 33⅓ %
" " Bonney's Adjust..₩ doz $48—dis 25&10 %
" " Stearns' " ₩ doz $48—dis 35&10 %
" " Ives' Expansive.....each $4 50—dis 40 %
" " Universal Expansive, each $4 50—dis 10 %
Gimlet Bits—Screw, $7 50; no screw, $9.....dis 30&10&10 %
Double Cut Gimlet Bits, Shepardson's.....dis 30 %
" " Ct. Valley Mfg. Co..dis 30&10 %
" " Hartwell's.....dis 50 %
" " Douglass'.....dis 25&10 %
" " Ives'.....dis 30 %
Morse's Bit Stock Drills, List of Jan'y 1, '76.....dis 25 %
L'Hommedieu's Ship Augers.....dis 20 %
Watrous Ship Augers.....dis 20 %
Vaughan's Foot Hole—
6 in. $28 00; 7, 8 and 9 in. $25 per doz.....dis 20 %

Awls, Brad Sets, &c.
Awls, Sewing, Common.....per gross $1 20—dis 15 %
" " Best.....per gross $1 60—net
" Shouldered Peg.....per gross 2 75—dis 15 %
" Patent Peg.....per gross 90—dis 15 %
" Shouldered Brad.....per gross 2 25—dis 15 %
Brad Sets, Aiken's.....per doz $13 50—dis 40 %
" No. 45, $10 50; No. 48, $12 50.....dis 4 &10 %
" Clark's.....dis 50 %
" Stanley's Excelsior.....$18 50—dis 30&10 %

Axes.
Brooks's.....per doz $13 00 @ 14 00 net
Blood's.....per doz $15 00 @ 16 50—dis 20 %
Hunt's.....₩ doz $12 50 @ 14 00
Collins'.....₩ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) brond'd or red..₩ doz $11 00 net
Hurd's.....₩ doz 11 00 @ 11 50
Simmons'.....₩ doz 12 00 @ 12 50
Morris'.....₩ doz 12 00 @ 12 50
Red Jacket.....₩ doz 11 50 @ 13 00
Mann's.....₩ doz 11 50 @ 13 00
" Double Bitted.....₩ doz 21 50 @ 22 00
Underhill's.....₩ doz 12 00 @ 13 00
" Crown.....₩ doz 12 50 @ 13 50
John Leverett's.....₩ doz $10 00 @ 12 50 net
Ten Eyck.....₩ doz 10 50 @ 11 50 net
M. H. Jones & Co.....per doz $10 50, net
Nobles Mfg. Co.....per doz $10 50 @ 11 00 net
Elephant.....₩ ℔ 6c.

Axle Grease.—Frazer's.....
Balances......dis 40 %
Bands.—Crated.....new list dis 50&5 %
Iron Rim.....new list dis 25&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Oroide.....new list dis 50&5 %

Bed Keys.
Gray's Ratchet.....₩ doz $4 00, dis 15 %

Bells.
Hand, Light Brass.....dis 70&10 %
" Extra Heavy.....dis 40&10 %
" White Metal.....dis 50&10 %
" Silver Chime.....dis 30&10 %
" Swiss.....dis 25 %
" Globe (Cone's Patent).....dis 20&10 %
Gong, Abbe's.....dis 20&10 %
" Yankee.....dis 35&10 %
" Barton's.....dis 25 %
Crank, Taylor's.....dis 25&10 %
" Brooks'.....dis 50 %
" Cone's.....dis 10 %
" Connel's.....dis 50&10 %
Lever, Sargent's.....dis 50&10&10 %
" Taylor's Bronze or Plated Lever.....dis 50&10 %
" Japanned Lever.....dis 20&10 %
" Hart, Bliven & Mead Mfg. Co.....dis 50&10 %
Bull, " " " " .....dis 50&10 %
" Brook's.....dis 50 %
" Western.....dis 25 %
Call.....dis 15 %
Cow—Common Wrought.....dis 20&10 %
" Western.....dis 20&10 %
" " Sargent's.....dis 50&10&10 %
" Kentucky "Star".....dis 20&10 %
" " Sargent's.....dis 50&10&10 %
" Dodge's Genuine Kentucky, new list—
No. 0 1 2 3 4 5 6 Hog.
$14 00 10 00 9 00 8 00 6 00 5 00 3 50 2 50 5 00—dis 45 %
" Yaw's Genuine.....dis 35 %
" Texas.....dis 25 @ 40 %

Bellows.
Blacksmiths', Common, List of Sept. 15.....dis 15 @ 20 %
" Extra and Pittsburgh Pattern.....List net
Moulders'.....dis 20 %
Hand Bellows.....dis 10 %

Blind Adjusters.—Domestic.....₩ doz $3—dis 20 %
Blind Fasteners.
Mackrell's.....dis 30 %
Van Sand's, No. 2000, $14 00; No. 3500, $10 50, net @ dis 5 %
Washburn's Patent.....₩ gross $14 00 dis 5 %
Merriman's.....new list net

Blind Staples.
Boardman's Patent, ½ in. and larger.....₩ ℔ 37 c
" ⅜ in....." " 42 c

Blocks.
Differential Pulley Blocks.....dis 25 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list.....dis 30&10 %
Burr's.....dis 10 %
Stanley Rule and Level Co.....dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c.....dis 60&10 %
Cast Iron Chain.....dis 60&10&10 %
Wrought Iron Barrel.....dis 50, 10&10 %
" " Square.....dis 50, 10&10 %
" " Shutter.....dis 60&10 %
Wrought Iron Flush, Stanley's.....dis 15&10 %
" " Sargent's.....dis 50&10&10 %
Carriage and Tire, Common.....dis 75 %
" " " Norway Iron.....dis 50 &10 %
" " " R. B. & W.....(old list) dis 65 %
" " " Philadelphia.....dis 60&5 %
" " " Shelton's.....(old list) dis 65&10 %
Union Nut Company, old list.....dis 65&5 %
Stove.....dis 30 %
" R. B. & W.....dis 35 %
" Shelton's Shaved Head.....dis 25 %

Borax......15c. ₩ ℔

Boring Machines.

	Upright.	Angular.
Hovey's, 20 Augers	$215	$440 net
" with Augers	270	600 net
Douglass', 20 Augers	550	750 dis 40 %
" with Augers	940	1100 dis 40 %
Parr's, 20 Augers	500	750 dis 30 %
" with Augers	750	1000 dis 30 %
Kellogg's, 20 Augers	525	675 dis 15 %
Sweets' "	925	1000 net
" with Augers	500	600 net
Snell's, "	475	625 dis 20 %
Phillips', with Augers		1000 dis 25 %
Mortising Machines, $200 each		dis 25 %

Bow Pins.
Union Nut Co.....new list dis 50&10&5 %
Hotchkiss'.....dis 50 & 55 %
Hunnason, Beckley & Co.'s.....dis 50&10 %
Sargent & Co.'s.....dis 60&10&10 %

Braces.
Barber's Patent.....dis 40&5 %
C. S. Backus.....dis 40&10 %
Wilson Mfg. Co.....dis 10 %
Spofford's Patent.....dis 50 %
Noble's Patent.....dis 40&5 %
Ives' Novelty.....dis 40&7½&10 %
" Hamden.....dis 25&10 %
Common Bell (American).....dis 25 %

Brackets.—Shelf.....dis 60&10 @ 65&10 %
C. S. Backus.....dis 65&10&10 %

Bung Hole Borers.
Common and Ring.....dis 20&10 %
Ives' Tap Borers.....dis 10&10 @ 25 %
Enterprise Mfg. Co.....dis 20 %

Butchers' Cleavers.
Hunnason & Beckley Mfg. Co.....dis 20&10 %
Bradley's.....dis 25 %
Beatty's.....dis 20 %

2	3	4	5	6	7	8	9
$19 00	$21 00	$24 00	$27 00	$30 00	$37 50	$36 50	$40 00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$26 25	$29 75	$34 25	$38 75	$43 25	$47 50	$54 00

Butts.
Wrought Brass.....dis 30 %
Cast Brass.....dis 30 %

COMMON CAST, NOT DRILLED.

Fast Joint, Narrow,	New list July	dis 30&10 %
" Broad	"	dis 40&10 %
Loose Joint, Narrow and Broad	"	dis 35&10 %
" " Jap'd	"	dis 45&10 %
Parliament Butts & Mayer's Hinges	"	dis 4 &10 %
Loose Pin	"	dis 45&10 %
" Japanned	"	dis 55&10 %
Loose Pin, Jap'd, Plated Tips	"	dis 50&10 %
" Drilled and Wired.		
Fast " Narrow	New list July 1,	dis 25&10 %
" " Broad	"	dis 35&10 %
Fast Joint, Broad, Japanned,	New list July 1,	dis 30&10 %
Loose Joint	new list July 1,	dis 45&10 %
" Japanned	"	dis 45&10 %
Parliament & Mayer's Hinges	"	dis 35&10 %
Loose Pin	"	dis 40&10 %
" Japanned	"	dis 50&10 %
" " Plated Tips	"	dis 45&10 %

Union Mfg. Co.'s Fancy Butts.—
Figured Enameled Loose Joint.....dis 55&10 %
Nickel Plated " .....dis 33⅓&10 %
Boston Finish, Plain.....dis 30&5 %
" " with Iron Acorns.....dis 75&5 %
" " with Silv'd " .....dis 65&5 %

WROUGHT IRON.

Fast Joint, Narrow.....dis 30&5
" Lt. Narrow.....dis 25&5
" Broad.....dis 35&5
Loose Joint, Broad.....dis 40&5
Table Butts, Back Flaps, &c.....dis 3 &5
Inside Bunn, Regular.....dis 30&5
" " Light.....dis 40&5
Loose Pin Wrt.....dis 35&5
Am. Spiral Spring Butt Co., list May 1st.....dis 20 %
Union Spring Hinge Co.....dis 20 %
Blind Butts, Parker.....dis 65&10 %
" Palmer.....dis 40 %
" Seymour.....dis 60&10 %
" Shepard.....dis 60 @ 65&10 %
" Lull & Porter.....dis 60 %
" Nicholson.....dis 45&10 %
" Huffer.....dis 33⅓&10 %
" Garretson, No. 1.....dis 65 %
" Clark's, Nos. 1, 2 and 5.....dis 65&10 %
" Clark's No. 3.....dis 70&10 %
" Nos. 2 4, 4½, 6, 8, 10.....dis 45 %

Can Openers.
Messenger's Comet.....per doz $3 00 dis 20 %
American.....per doz 2 25 dis 40 %
Lyman's.....per doz 3 75 dis 20 %
No. 4, French.....per doz 2 25 dis 45 @ 50 %
No. 5, Iron Handle.....per doz 2 25 dis 45 @ 50 %
Sprague's.....Nos. 1 2 3 4
Per doz $4 00 4 50 5 00 9 00 dis 55&10 %
Star.....per doz $3 00 dis 2&10 %
Eureka.....per doz $3 50 net
Sardine Scissors.....per doz $7 00 dis 45 @ 50 %

Caps—Percussion, per 1000.
G. D.....37 @ 40c
Ely's E. B.....1-10s, 55c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1 45; 1-10s, $1 52½c., gold
Colt's.....1-10s 80c gold

Carpet Sweepers.
Clifton.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.—Metallic.....dis 57½ @ 60 %

Cards.—Horse and Curry.....dis 30&10 %
Cotton.....dis 10&10 %
Wool.....dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished.....per doz $5 00 dis 30 %
Cast Iron, Steel Points.....per doz $2 00 dis 45&5 %

Casters.
Bed.....dis 30&10 @ 40 %
Plate and Shallow Socket.....dis 40&10 %
Deep Socket.....dis 40 %

Cattle Leaders.
Hotchkiss' Sons'.....net
Humason, Beckley & Co.'s.....dis 60 %
Sargent's.....dis 60&10 %

Chain
Kingman Coil.....net gold
₩ ℔ 11½ 9 7¾ 7⅝ 7½ 7c
8-16 ¼ 5-16 ⅜ 7-16 ½
Trace, 6¼-10-2.....by the cask, ₩ pair, gold 55c
Trace, 7-10-2.....by the cask, ₩ pair, gold, 63c
German Halter Chain.....dis 20 @ 25 % gold
German Coil.....dis 20 @ 25 % gold
Galvanized Pump Chain.....₩ ℔ 13c
Galvanized Pump Chain.....dis 50&10 %
Jack Chain, Iron.....dis 40&10 %
" Brass.....dis 40&10 %

Chalk.
White.....₩ gross, 57c net
Red.....₩ gross, 90c net
Blue.....₩ gross, $1 00 net
White Crayons.....₩ gross, 16¼c net

Chisels.
Socket Framing, Douglass, Extra.....dis 60&10 %
" " Crossman.....dis 50&15&10 %
" " Buck Bros.....new list dis 15 @ 17½ %
" " Hart Mfg. Co.....dis 60&10 %
" " Merrill.....dis 60&10 %
" Firmers, Douglass, Extra.....dis 60&10 %
" " Crossman.....dis 50&10&10 %
" " Buck Bros.....new list dis 15 @ 17½ %
" " Hart Mfg. Co.....dis 60&5 %
" " Merrill.....dis 60 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 40 %
" " Butcher's.....$5 50 to £ gold
" " Newbould's.....$5 50 to £ gold
" " Spear & Jackson's.....$5 00 to £ gold
" " Buck Bros (Shank).....$5 50 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron.....dis 25 %
" Adjustable, Gray's.....dis 20 %
" " Lambert's.....dis 2 %
" " Snow's.....dis 40&5 %
" " Hammer's.....dis 10 %
" Cabinet, Sargent's.....dis 60&10 %
" Carriage Makers', Sargent's.....dis 55&10 %
Saw Clamps.....see vises

Clips, Axle.
Norway or Best.....dis 30 @ 40 %
Superior.....dis 50 @ 55 %

Coal Shovels.

	Nos.	1	2	
Wrought Iron.				
Long Wrt. Handles	per gross,	$15 00	18 00	dis 25 %
Short "	"	12 00	14 00	dis 25 %
Wood Handles	"	12 00	14 00	dis 25 %
Gem (Edgar's Pat.)	"	15 00	18 00	dis 25 @ 30 %
Cast Iron, Iron Handle	per doz, 75 @ 80c. net			
" Wood Handle	per doz, $1 00 net			

Coal Hods.

Inch.	14	15	16	17	18	
Regular, Jap'd	per doz, $12 00	12 75	13 50	15 50	16 00	dis 60&10 %
Regular, Gal'd	"	15 00	16 00	17 50	19 50	22 50 dis 50&10 %
Ladies' Favorite, Jap'd	₩ doz	15 00	16 00	18 00	20 00	dis 50 %
Ladies' Favorite, Galvanized	"	19 00	20 00	22 00	25 00	dis 45 %

Funnel Hods.—	Nos.	15	16	17	
Oriental, Japanned	₩ doz.	$16 50	18 00	20 00	dis 50 %
" Galvanized	"	21 50	22 50	24 00	dis 40 %
Morning Glory, Jap'd	"	16 50	16 00	18 00	dis 50 %
" Gal'd	"	21 00	22 50	24 00	dis 40 %
Iron Clad, Jap'd	"		21 50		dis 60&10 %
" Gal'd	"		22 50		dis 50&10 %

Sidney Shepard & Co.'s new list.....dis 12 %

Cockeyes....1¼ in., 28c.; 1¾ in., 33c.; 1¾ in., 37c. net

Cocks.
Brass Racking.....dis 40 %
Lock and Globe.....dis 40 %
Lever Bibbs.....dis 40 %
Air and Beer.....dis 25&10 %

Coffee Mills.
Board and Box.....dis 15 @ 20 %
Brighton.....dis 20 %
Increase Wilson's.....dis 20 %
Selsor's Pat.....$9 50, $10 50—dis 25 %
American (Enterprise Mfg. Co.).....dis 20 %
French Steel.....dis 20 %
The Swift.....dis 20 %

Compasses and Dividers.
Bevins & Call Co.'s.....dis 25&10 %
Cook's.....dis 15 %
Excelsior.....dis 40 %
Peck Stow & Wilcox.....dis 25 %
Miller's Patent.....dis 25&10 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brounbacher.....dis 15 @ 20 %

Corkscrews......dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Crow Bars.
Cast Steel.....₩ ℔ 11c. net
Iron, steel points.....₩ ℔ 5c
Crucibles.—Gautier & Co.....₩ No. 5½c

Curling Irons, &c.
½, ⅝, ¾ in., $1 85, $2 00, $2 40.....dis 10 %
Curling Tongs.....₩ doz $6 50—dis 15 %
Pinching Irons.....₩ doz 7 50—dis 20 %

Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list.....dis 40 %
Fitch's (List of No 20's, $1).....dis 25&10 %
Rubber.....₩ doz, $9 00—dis 15 %
Wood Tooth (Fuller Bros.).....per doz $2 25 net

Curtain Pins.—Silvered Glass.....new list dis 15 %

Cutlery.
American Table, Pocket } Meriden Cutlery Co } New list Jan. '75, dis 25 %
American Pocket—Humason & Beckley Mfg. Co.....dis 20&10 %
Am. Miller Bro.'s Cutlery Co.....dis 25 %
Naugatuck Cutlery Co.....dis 25 %

Dippers.
Britannia.....per doz 75c.—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain.....per doz $2 25—dis 20 %
" Rimmed.....per doz $3 75—dis 20 %

Dog Collars.
Embossed Gilt.....dis 30 %
Leather.....dis 30 %
Brass.....dis 25 %

Door Springs.
Rod, Torre 's.....₩ doz $2 50 net
" Gray's.....₩ doz $2 50 net
" Johnson's.....₩ doz $3 00 net
Coil Springs, Gem.....Nos. 1 2 3
Per dozen.....$3 50 $2 50 $2 00, dis 10 %
Challenge—Nos. 9 7 6
Japanned.....per doz $2 00 2 50 3 50
Coppered.....per doz 4 00 4 50 5 00 } dis 10 %
Galvanized.....per doz 3 50 4 00 4 50
Nickeled.....per doz 5 50 6 00 7 00
Philadelphia.....5 in., $5 00; 8 in., $7 00 dis 15 %
Barker's Concealed.....dis 15 %

Drawing Knives.
Crossman's No. 1.....dis 50&15&10 %
Douglass, Extra.....dis 60&10 %
Hart Mfg. Co., No. 1.....dis 60 %
Merrill.....dis 60&10 %
Nobles Mfg. Co.....dis 15 %
Bradley's.....dis 25 %
Adjustable Handle.....dis 15 %

Drills and Drill Stocks.
Blacksmiths'.....each $3 00 net
" Self-Feeding.....each $6 00 net
Breast, P. S. & W.....dis 45 %
" Aiken's.....dis 25&10 %
" Hotchkiss.....dis 10 %
" Wilson's.....dis 10%
" Miller's Falls.....dis 25 %
Ratchet, Merrill's.....dis 20 %
" Ingersoll's (old list).....dis 35 %
" Whitney's.....dis 20 %
Ratchet, Weston's.....dis 10 %
" Moore's Triple Action.....dis 20 @ 25 %
Wilson's Drill Stocks.....dis 10 %
Automatic Boring Tools.....each $2 75—dis 20 %

Drill Chucks.
Danbury.....each 10 00, dis 20 @ 25 %
Morse's Beach Patent.....dis 30 %
" Adjustable.....each $10 00, dis 30 %

Egg Beaters.
Monroe's.....8 in. 10 in.
Per doz $8 00 9 00 .....dis 10 %
Dover.....₩ doz $5 00—dis 20 %
National.....₩ doz $4 50—dis 20 %
" .....₩ doz $9 00—net

Emery.
Genuine Chester—Regular Nos.....₩ ℔ 6c } dis 10 %
" Flour and FF.....₩ ℔ 4c }
Washington Mills—Regular Nos.....₩ ℔ 9c
" Flour.....₩ ℔ 5c
Wellington Mills, Grain.....₩ ℔ 10c. net
" Flour.....₩ ℔ 8c. net

Enameled and Tinned Ware.
Kettles.....dis 30 @ 40 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 25 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 15&10 %
Wood and Metallic.....dis 40 %
Wood, Cork Lined.....dis 60 @ 65&5 %
Enterprise Mfg. Co., Self-Measuring.....dis 30 %

Felloe Plates......₩ ℔ 15c.; dis 25&10 %

Files.
American File Co.....$5 00 to £ currency—dis 20 %
Arcade File Works.....$5 00 to £ currency
Auburn File Works.....$5 00 to £ currency
Nicholson.....new list, Jan. 1, 1875, net
Heller & Bros.....$5 00 to £ currency
Johnson & Bro.....$5 00 to £ currency
" Western".....5 00 to £ net
Wheeler, Clemson & Co.....$5 00 to £ currency
Barton's.....$5 to £ currency
J. & Riley Carr.....5 25 to £ gold
" Horse Rasps.....5 50 to £ gold
Stubs'.....5 50 @ 9 00 to £ gold
Butcher's.....5 25 to £ gold
Walter Spencer & Co.'s "Diamond".....5 00 to £ gold
Spear & Jackson's.....5 00 to £ gold
Jowitt's.....4 50 to £ gold
Newbould's.....5 25 to £ gold
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Turton Bros. & Matthews'.....$5 50 to £ currency
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.'s).....5 00 to £ gold
" Horse Rasps.....5 25 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold
Limet & Co. (French).....4 25 to £ gold
Boynton's Cant Files.....5 in., $2 10; 10 in., $4 20 doz dis 5 %

Fluting Machines.
Mrs. Coles' Pony..4 in., $4 75; 5 in., $5; 6 in., 5 50; 7 in., $6
Knox, 6-inch Rolls.....$6 25, dis 10 %
" 8 " .....$8 00, dis 10 %
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....4 75 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
" No. 3.....7 50 each net
Diamond.....6 00 each net
Champion, 6 inch rolls.....6 00 each net
" 4 inch rolls.....5 00 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
Defiance.....4 in., $3 50; 6 in., $4 00; 8 in., $6 50 each net
K. F. M., 4½-inch Roll.....5 50 each dis 15 %
" 5-inch Roll.....6 00 each dis 15 %
Myers' Fashion Fluter, 4½ inch Rolls.....3 75 each net
" Convex Brass Fluter, Sad Iron attachment.....per doz $15 00
Domestic Fluter.....$1 50 each net
Geneva Hand Fluter.....$15 00 per doz net

Fluting Scissors......dis 25&10 %

Forges.
"Empire" (W. P. Kellogg & Co.).....dis 30 %

Forks.
Hay, Manure & Spading.....dis 50 %
Plated A 1.....dis 40&5 %

Fry Pans.
Burnished, P. S. & W., new list.....dis 40 %
₩ doz.....3 00 3 75 4 25 4 75 5 25 6 00 7 00 8 00 9 00
No.....0 1 2 3 4 5 6 7 8

Gauges.
Marking.....dis 45&10 %
Wire.....dis 10 %
" Smith's Patent.....per doz $18 00, dis 40 %

Gimlets.
Nail and Spike.....dis 25&10 %
"Bee" Gimlets.....per gross, $12 00, dis 30 %
Double Cut, Shepardson's.....dis 20 %
" " Hartwell's.....dis 40 %
" " Ives'.....dis 25 %
" " Douglass'.....dis 25&10 %

Glue Pots.
Tinned and Enameled.....dis 25 %
Family, Howe's "Eureka".....dis 25 %
" L. E. & C.'s "Handy".....dis 30 %

Grind Stone Fixtures
Sargent's Patent.....dis 65&10 %
Reading Hardware Co.....dis 70&10 %
J. F. Green & Bro.....dis 25 %
Hart Mfg. Co.'s.....dis 60&5&10 %
Rice Bros.....dis 45&5 %

Hammers.
Emmet Hammer Co.'s Handled.....dis 25 %
" " Sledge & Stone.₩ ℔ 40c.; dis 40 %
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's.....dis 12 %
Henry Hammonds' (Maydole's List).....dis 12 %
Cheney's.....net @ dis 5 %
Verree.....dis 5 %
Yerks & Plumb.....dis 20 %
Magnetic Tack.....dis 25&10 %
Warner & Noble's.....dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair.....} dis 25 %
" Leg Irons $8 50 per pair.....}
Providence Tool Co.'s Hand Cuffs $15 per doz } dis 10 %
" " Leg Irons 25 " }

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4
Per doz	$1 80	1 00	1 18	1 35	1 50—dis 60&10 %

Boggin's Latches.....35c. @ 45c. net
Bronzed Iron Drop Latches.....per doz $1 10 @ 1 20 net
Wrought Chest.....dis 60&10 %
Surface Chest.....dis 65&10&10 %
Flush Chest.....dis 60&10&10 %
Lifting.....dis 60&10 %
Coffin.....dis 50&10 @ 60&10 %
Saw and Plane.....dis 25&10 %
Boynton's Patent X Cut.....dis 10&5 %
" Centennial X Cut.....dis 15&5 %
" Ice Saw, Wrought Iron.....each $1 00 net
Hammer and Hatchet.....dis 10 %
N. Carolina Handle Co.....dis 15 %

Brad Awl		per gross	$3 50	dis 20&10 %
Apple	"	ass'td	5 25	dis 20&10 %
"	"	large	6 50	dis 20&10 %
Apple	"	ass'td	6 00	dis 20&10 %
"	"	large	7 50	dis 20&10 %
Socket	"	ass'td	9 50	dis 20&10 %
" Framing	"	"	7 00	dis 20&10 %
File	"	"	4 00	dis 20&10 %
Auger	"	"	6 50	dis 20&10 %
"	"	large	8 00	dis 20&10 %
Patent Auger, Ives'				dis 25&10 %
" "	Douglass'	per set	$1 25	dis 10 %
" "	Swan's	per set	$1 00	dis 20&10 %

Hangers.
Barn Door.....dis 65&10 %
"Anti-Friction" No. 1, $1 25; No. 2, $1 50 ₩ pr. dis 30&5 %
Novelty.....dis 40 %
Challenge.....dis 40 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's (Bristol).....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....dis 50&10 %
New York Wire.....dis 30&20 %

Hatchets.—Isaiah Blood.....dis 15 %

Shingling, Nos.	1 2 3.	₩ doz	$7 25	8 00	8 75
Claw, "	1 2 3.	₩ doz	7 75	8 50	9 25
Lathing, "	1 2 3.	₩ doz	7 50	8 00	8 50

Hunt's.....dis 15 %

Shingling, Nos.	1 2 3.	₩ doz	$7 25	8 00	8 75
Claw, "	1 2 3.	₩ doz	7 75	8 50	9 25
Lathing, "	1 2 3.	₩ doz	7 50	8 25	9 00

Hurd's.....dis 20 %

Shingling, Nos.	1 2 3.	₩ doz	$8 00	8 50	9 00
Claw, "	1 2 3.	₩ doz	9 00	9 50	10 00
Lathing, "	1 2 3.	₩ doz	8 00	8 50	9 00

Newark's Edge Tool Co.'s.....dis 20 %

Shingling, Nos.	1 2 3.	₩ doz	$6 50	7 00	7 50
Claw, "	1 2 3.	₩ doz	7 25	7 75	8 25
Lathing, "	1 2 3.	₩ doz	6 50	7 00	7 50

Yerxes & Plumb.....dis 20 %

Shingling, Nos.	1 2 3.	₩ doz	$7 00	7 50	8 00
Claw, "	1 2 3.	₩ doz	7 50	8 00	8 50
Lathing, "	1 2 3.	₩ doz	7 00	7 50	8 00

Stanton's.....dis 15 %

Shingling, Nos.	0 1 2 3.	₩ doz	$7 50	8 00	8 50
Claw, "	1 2 3.	₩ doz		9 00	9 50
Lathing, "	1 2 3.	₩ doz		8 00	8 50
Broad, "	1 2 3.	₩ doz		9 00	10 00
" "	4 5 6.	₩ doz		14 00	16 00
" "	7 8.	₩ doz		20 00	22 00

Elephant.....dis 20 %

Shingling, Nos.	1 2 3.	₩ doz	$8 00	8 50	9 00
Claw, "	1 2 3.	₩ doz	9 00	9 50	10 00
Lathing, "	1 2 3.	₩ doz	8 00	8 50	9 00

J. P. Verree & Co.....dis 5 %

Shingling, Nos.	1 2 3.	₩ doz	$7 00	7 50	8 00
Claw, "	1 2 3.	₩ doz	7 50	8 00	8 50
Lathing, "	1 2 3.	₩ doz	7 00	7 50	8 00

Underhill's.....dis 10 %

Shingling, Nos.	1 2 3.	₩ doz	7 25	8 00	8 75
Claw, "	1 2 3.	₩ doz	7 75	8 50	9 25
Lathing, "	1 2 3.	₩ doz	12 00	11 00	13 00

M. H. Jones & Co.....dis 25 %

Shingling, Nos.	1 2 3.	₩ doz	$8 00	8 50	9 00
Claw, "	1 2 3.	₩ doz	9 00	9 50	10 00
Lathing, "	1 2 3.	₩ doz	8 00	8 50	9 00

Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling.....Hart's list.....dis 60&10&10 %
" " " " " " Sargent's list.....dis 6 &5&10 %
" " " " " " Reading list.....dis 35&10 %

Wrought Staples and Hooks and Staples.....dis 70&10 @ 75 %
Wire Screw Hooks and Eyes.....dis 65&10&10 %
Grass.....dis 2 %
Whiffletree—Patent.....dis 33⅓ %
Hooks and Eyes—Malleable Iron.....dis 60&10&10 %
" " Brass.....dis 60&10&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable	₩ ℔	30c	27c	25c	24c	23c	22c
" P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
" " & Blued	"	31c	28c	26c	25c	24c	23c
Cortland	"	29c	26c	24c	23c	22c	21c
Buffalo Forged	"	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin	"	29c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin	"	30c	27c	25c	24c	23c	22c
Perkin's P't'd—Black, Perkins' Pointed and Polished	"	29c	25c	23c	22c	21c	20c
Perkins' Pointed and Blued	"	30c	26c	24c	23c	22c	21c
Putnam	"	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued	"	31c	28c	26c	25c	24c	23c

Star brand, 16c.; Morgan.....14c
Putnam.....20 0 lbs., dis 5 %
Ausable, National and New London.....1000 lbs., dis 5 %
Perkins' and Vulcan.....1000 lbs., dis 7½ %
Perkins', Vulcan and Globe.....500 lbs., dis 5 %

Horse Shoes.
Burden.....₩ keg, $4 37½
ft. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 4 62½
" " R. I. Pattern.....₩ keg, 4 87½
Mule Shoes.....₩ keg, 5 62½
Perkins' Snow.

Sieves.—Mann's Patent.....dis 30 @ 35 %

14	16	18	20	24	30 mesh
Iron...$4·00	4·00	4·25	4·50	4·75	6·50 ₩ doz
Plated. 4·75	5·00	5·25	5·50	5·75	6·50 "

Wood Rims.....18 mesh, small, $1·50 per doz, dis 10 %
" " " Regular, 1·80 per doz, dis 10 %

Shears and Scissors.
Cast Steel.....dis 75&10 %
Cast Iron.....New list July 15,.....dis 40 %
Heinisch Sons' Trimmers and Scissors.....dis 65 %
" " Standard quality Shears and Trimmers.....dis 40 %
Seymour's Straight Trimmers.....dis 60&10 %
" Scissors.....dis 50 %
Pruning.....der doz $10 00—dis 35 %
Barnard's Lamp Trimmers.....per doz $9·75

Sheaves.
Sliding Door, M. W. & Co. list.....dis 40&5&2 %
" R. & E. list.....dis 50&5&2 %
" Patent Roller.....dis 25 %
" " Hatfield's.....dis 30 %
" Russell's Anti-Friction.....dis 50&2 %
Sliding Shutter. R. & E. List.....dis 30&5&2 %
" " Sargent's List.....dis 55&10 %

Shovels and Spades.
Ames.....dis 20 %
Birmingham Shovel Co.....dis 15 %
Rowland's.....dis 25 %
Old Colony.....new list dis 10&5 %
Middleboro' Shovel Co.....new list dis 20 %
C. E. Jennings & Co.....New list dis 30&10 %
Dunning & Shovels and Scoops.....dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 50&10&2 %
" " Hart's.....dis 55&2&10 %
Polished Steel.....dis 50&10&2 %

Skates.
Barney & Berry's
N. Y. Club.....₩ pair $2·75
B. & B. Club....." 3·50
All Clamp....." 4·25 } dis 25 %
Rink....." 8·00
Florence Steel.....$1·00 dis 25 %
" Spring.....$4·00 dis 30 %
" All Clamp.....3·50 dis 30 %
Peck & Snyder's—
No. 1. Blued.....per pair $3·00
No. 2, Nickel Plated.....per pair 6·00
No 3, " extra..per pair 8·00
Clipper Club Blued.....per pair 3·50 } dis...35 %
" " Full Pol'd.....per pair 4·50
" " " and Nickel Plated.....per pair 6·00
Acme Club Skates.—Nos. 5 7 10 12 14
Pair $4·00 5·00 7·00 7·50 8·00 dis 20 %

Slates.
Square Frames, Round Cornered, by case.....dis 65&10 %
Less than a case.....dis 65 %

Spoke Shaves.
Iron.....dis 33⅓&10 %
Wood.....dis 30 %
Bailey's.....dis 25&10 %

Spoke Shave Irons.
Spear & Jackson's.....$5·00 to £ gold

Spoons.
Tinned Iron.....dis 10 %
By the case.....dis 20 %
Basting.....dis 10 %
Britannia.....dis 60&5 @ 55 %
" Boardman's, new list.....dis 55 %
Rogers & Bro., A 1.....dis 40&5 %
Derby Silver Co.....dis 40&5 %
Holmes, Booth & Haydens.....dis 40&5 %
Nickel Silver Co.....dis 40 %
German Silver.....dis 30&5 %
Tin (P. S. & W.)—
Teas.....$1·50 ₩ gross, net
Tables.....2·75 " net

Stocks and Dies......dis 5&10 %

Stone.
Hindostan Stone.....₩ ℔ 6c
" Axe Stone.....₩ ℔ 8c } dis 20&10 %
" Slips.....₩ ℔ 10c
Sand Stone.....₩ ℔ 6c—dis 20&10 %
Washita Stone.....No. 1, ₩ ℔ 30c net
" " .....No. 2, ₩ ℔ 25c net
" Slips.....No. 1, ₩ ℔ 60c net
Arkansas Stone.....No. 1, ₩ ℔ $1·35 net
" Slips.....No. 1, ₩ ℔ $2·50 net
Grindstones. Family, J. F. Green & Bro.....dis 50 %
" " Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross, 6 00
Gem.....₩ gross $4·25 @ 4·50 net
Gold Medal.....₩ gross $6 00 dis 25 %
Rising Sun.....per gross $5·75 net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₩ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 30 @ 35 %
Disston's Try Squares No. 1.....dis 40 %
" " No. 2.....dis 45 %
" " Improved, Nos. 1 & 2.....dis 30 %

Tacks, Brads, &c.—List of January 1, 1876.
Tacks, Half Weight, American.....dis 75&10 %
" Full " .....dis 5&10 %
" Half " Swedes.....dis 65&10 %
" Full " .....dis 30&10 %
" Carpet, Am. and Swedes.....dis 10&10 %
" Leather Head.....dis 10&10 %
" Copper.....₩ ℔ 45c. dis 10 %
Brads, Half Weight.....dis 50&...0 %
Shoe Nails—
4-8ths and longer, 9c.; 3½-8ths, 9½c. ₩ ℔, dis 10 %
Trunk, Clout and Finishing Nails—

2	3	11	13	18	
8	8	8	8	1	1¼ in. and over.

Double Pointed Tacks.....dis 33⅓&10 %

Tapes, Measuring.
American Flask and Cap Co.....dis 20 %
Eddy's.....dis 20 %

Tea Trays.
American Tea Tray Co.....dis 15 %

Thermometers.
Tin Case.....dis 50&10 %

Toe Calks.
Winsted.....₩ ℔ 13c., dis 10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....per doz $12—dis 25&10 %
All Iron.....per doz $10·50—dis 25&10 %

Tinners' Tools and Machines.
P. S. & W.....dis 10 %

Traps.
Game, Newhouse.....dis 25 %
" Peck, Stow & Wilcox.....dis 30 %
" Hotchkiss.....old list dis 30 %; new list dis 10 %
" Blake's Patent.....dis 30 %
Mouse, Wood Chocker.....₩ doz holes. 15 @ 16c
" Patent Chocker (Union Nut Co.).....₩ doz holes 16 @ 18c net
" Round, Wire.....₩ doz $1 50 to 2 00 net
" Square, " .....₩ doz 2 00 to 2 50 net
" Cage.....₩ doz 2 50, dis 10 %
" Patent Self Setting.....per doz holes 25c net

Trowels.
Lothrop's Brick and Plastering.....dis 10 %
Disston's Brick and Plastering.....dis 12½ %
Rose's Brick.....dis 5 %
Brades' Brick.....gold. dis 10 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %

Triers.
Butter and Cheese.....dis 25 %

Ventilators (Window).
Nickel and Gilt.....per dozen $16·00 @ 18·00

Vises.
Solid Box, Trenton...4 to 16½ lbs., 16c.; 160 and over, 20c
" " Wilson's.....30 to 160 lbs., 18c } dis 25 %
160 and over, 22c }
" " Peter Wrights.....16c gold
Parallel, Parker's.....dis 20 %
" Wilson's.....dis 33&10 %
" Sargent's.....dis 55&10 %
" Trenton.....dis 15 %
" Backus and Union.....dis 25 %
" Merrill's.....dis 15 %
" Fisher & Norris.....dis 15&10 %
" Buffalo.....dis 25 %
" Stevens'.....dis 15 @ 20 %
Saw Filers, Bonney's.....per doz $30·00 dis 20 %
" Sloan's.....per doz $30·00 dis 20 %
" Hopkins'.....per doz $17·50 dis 10 %

Wheel Barrows.
Canal (Pugsley & Chapman).....new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman).....dis 25 %

Well Wheels.
Revised list.....dis 60&10 %

Wire.
Brass and Copper.....List of Oct. 27, 1875, net
Bright and Annealed.....Nos. 0 @ 18 dis 45 @ 50 %
" " " 19 @ 26 dis 50 @ 55 %
" " " 27 @ 36 dis 55 @ 60 %
Coppered.....0 @ 18 dis 40 @ 45 %
Galvanized, Nos. 4 to 9.....₩ ℔ 8 @ 8½c net
Galvanized, Nos. 10 to 18.....market list dis 15 @ 20 %
Tinned.....dis 25 @ 30 %
Cast Steel.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 @ 40 %
Galvanized Telegraph, Nos. 4 and 9.....₩ ℔ 9c
Galvanized Telegraph. Nos. 10 and 11.....₩ ℔ 10c
" " 12.....₩ ℔ 10½c
Annealed Fence. Nos. 8 and 9.....dis 50 %
" Grape, " 10 to 14.....dis 50 %
Fence Staples.....₩ ℔ 7½ @ 8c
Stone' Steel Wire.....$7 00 to £ gold
Judd's Picture Wire.....dis 50 %
Clothes Line Wire.....per coil 60c. net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 30 %
" Diagonal.....dis 30 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&10 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 65&10 %
Diamond Hardware Co.....dis 40 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70&10 %
Davis Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %
" " Merrick's Pattern.....dis 25&2½ %
" " Brigg's Patent.....dis 15&10 %
Aiken's Pocket (Bright).....per doz $10·00—dis 50&10 %

Wringers. Less than 2 doz 2 doz lots
Providence.....₩ doz $7·00 $7·00
Reliance.....₩ doz 6·00 6·00
Universal—Extra.....₩ doz 7·00 7·00
Novelty.....₩ doz 7·00 7·00
Sherman.....₩ doz 7·00 7·00
Eureka.....₩ doz 6·00 5·00
Wringers without Cog Wheel..₩ doz 6·00 5·00

Stamped Tin Ware.
Common Stamped Ware.....dis 10 %
Stamped Deep and Retinned Ware.....dis 20&10 %
Japanned Tin Ware.....dis 5 %
Planished Tin Ware.....dis 10 %

METALS.

IRON.—DUTY Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb.

Pig Iron—AMERICAN.

Foundry No. 1	₩ ton,	$23 00
Foundry No. 2	"	21 50
Gray Forge	"	20 00

SCOTCH.

Coltness	"	32 00 @ 33 00
Glengarnock	"	30 00 @ 31 00
Gartsherrie	"	32 50
Eglinton	"	29 50 @ 30 50
Summerlee	"	

Bar Iron.
Am. Renned, at mill.....2·4c.

Rails.
American, at works, currency.....₩ ton 42 00 @ 46 00
Old Rails....." 30 00 @

Scrap.
Wrought Scrap....." 32 00 @

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square.... } ₩ ton $52 50
to 6 in. x ⅜ to 1 in..... }
Refined Iron.
¾ to 2 in round and square.... } " 55 00 @ 57 50
1 to 6 in. x ⅜ to 1 in..... }
1 to 6 in. x ¼ and 5-16..... " 60 00 @ 62 50
Shafting Iron—2½ to 4 in..... " 60 00 @ 65 00
Rods—3-16 to ⅝ round and square.. " 65 00 @ 110 00
Bands..... " 70 00 @ 72 50
Hoops—⅝ to 2 in..... " 75 00 @ 130 00
Swedish Iron.
Ordinary sizes..... " 130 00 @ 132 50
Plow size..... "

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	₩ ℔ 5¾ @ 4c	5c	5¾c
21 to 24	" 4c	5½c	5¾c
25 to 26	" 4¼c	5½c	5¾c
27	" 4¼c	5¾c	6c
28	" 4¾c	5c	6¼c
galvanized, 14 to 20, prime	₩ ℔ 8¼c	3d quality	₩ ℔ 7½c
" 21 to 24	" 9¼c	"	" 8¼c
" 25 to 26	" 10 c	"	" 9 c
" 27	" 10½c	"	" 9¾c
" 28	" 11¾c	"	" 10½c

Patent Polished.....₩ ℔ 14c
Russia, Nos. 8 to 16....." 15½c
" Stained. No. 1....." 14½c
Belgian.....10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

¾	5	5¾	6	7 inch.
$3·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

4½	5	5½	6	7 inch.
$5·00	7·00	9·00	12·00	14·00 per doz.

COPPER—DUTY. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot.....₩ ℔ 23½ @ 23¾c
English " .....

SHEATHING, BRAZIERS COPPER, BOLTS, &c.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....31c ₩ ℔
Braziers Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....33c. "
Braziers' Copper, 12 oz. per square foot.....35c. "
Circles less than 24 inch in diameter.....34c ₩ ℔
Circles, 24 inch diameter and over.....37c. "
Segment and Pattern Sheets.....34c. "
Locomotive Fire Box Sheets.....31c. ₩ ℔
Sheathing Copper, over 12 oz. per sq. ft.....30c. "
" 12 oz. ₩ sq. ft. and lighter.....35c. "
Bolt Copper.....31c. "
Copper Bottoms, 33c. ₩ ℔.....net
No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.

14 and 16 oz. and heavier.....37c. By the case, 36c. ₩ ℔
12 oz. and lighter.....40c. " " 39c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....39c. By the case, 38c. ₩ ℔
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier.....41c. ₩ ℔
12 oz.....44c. "

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60.....5c. "

Brass
Brown & Sharp's Gauge the Standard except for Fine Wire.

BRASS MANUFACTURERS' PRICE LIST.
October 27th, 1875.

Net cash prices for Roll and Sheet Brass, Wire, &c., for quantities of 100 pounds and over at one time. For quantities under 100 pounds, three cents additional.

HIGH BRASS

All Nos. to No. 28, and widths 14 in. and under.....27c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....3c
Over 20 in. to 30 in., inclusive.....33c
½c. ₩ ℔ advance on each No. above Nos. 28 to 36, inclusive.
All Brass thinner than No. 36 is Platers' Brass, at.....45c
Sheets 24x48 in. and all sheets cut to particular sizes and lengths.....33c
Printers' Rules.....40c
Sheets wider than 20 in. and under 40 in.....40c
" 40 in. and over.....42c
Circular sheets, in diam. from 4 in. to 14 inclusive.....37c
" " over 14 " 20, " 40c
" " 20 " 30, " 43c
" " 30 " 40, " 46c
" " 40 in.....49c

LOW BRASS.

Four cents ₩ ℔ more than High Brass.
Gilding Metal, 7c, ₩ ℔ more than High Brass.
Platers' or Gold Metal } In Bars.....42c
} Sawed.....45c
} Planed or Polished.....48c

FOR SLITTING.

Metal, in width 2 in. to ¼ in. to No. 30, inclusive, 1c. per ℔. advance.
Metal, in width 2 in. to 1 in., thinner than No. 30, 2c. per ℔. advance.
Metal, in width 1 in. to ⅛ thinner than No. 30, 3c. per ℔. advance.
Metal, in width ⅛ in. to ¼, to No. 30, 2c. per ℔. advance.
Metal, in width ⅛ in. to ¼ thinner than No. 30, 5c. advance.
Metal, ¼ in. in width and less, 10c. per lb. advance

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 in., to No. 26	₩ ℔ 80	₩ ℔ 80
6 " " "	90	90
10 " " "	1·00	1·10
15 " " "	1·00	1.35
18 " " "	1·10	1·50
20 " " "	1·20	

German Silver Sheets over 12 in. wide, and weighing more than 16 lbs., $2 per ℔., net.
Advance 2c. for each additional in., in width above 12 in., and 2c. per ℔. on each No. thinner than Nos. 26 to 36 inclusive.
All German Silver thinner than No. 36 is Platers', at 50c. per ℔. additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	0·30	0·34	0·40
Nos. 21, 22, 23	0·31	0·35	0·42
Nos. 24 and 25	0·32	0·36	0·43
Brass Rods, No. 8 and larger	0·36	0·40	0·46
Wire straightened and cut, smaller than No. 8	0·40	0·44	0·50

Fancy Wire not less than 4 cents per pound advance of Round Wire.
Spring Wire, 3 cts. per lb. advance.

FINE WIRE, BY THE OLD ENGLISH FINE WIRE GAUGE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 28	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·03
No. 36	0·78	0·82	1·15
No. 37	0·96	0·98	1·28
No. 38	1·28	1·28	1·58

Ten cents per pound extra for Spooling.

TUBING.

	₩ ℔
Plain to No. 20 inclusive, above ⅝ in. to 1½ in.	$ ·44
" 1½ to 3 in. inclusive	·38
" above 3 in.	·50

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.

Plain ⅝ inch	·50
" 5-16 "	·60
" ½ "	·80
" 5-16 "	1·20
" ⅝ "	1·60

All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing, 4 cents advance on List above Plain.
English, Scotch and Extra Patterns Fancy Tubing to No. 20, 9 cents above Plain.
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under two feet.
All Mandrel Drawn Tubes under ⅝ in., 25 cents per pound advance.

ZINC TUBING.

Plain	·28
Fancy	·31
Scotch and Extra Patterns	·34

GERMAN SILVER TUBING.

4 Per cent.	
6 "	·95
9 "	1·10
12 "	1·25
15 "	1·40
16 Per cent.	1·45
18 "	1·55
20 "	1·65

MISCELLANEOUS.

Common Plain Brass Pail Ears	·39
Hose Pipes, 500 and over	·71
" under 500	·76
Door Rail	·40

SCRAP.

High Brass Scrap, 16 cents.
Low " 18 cents.
Gilding, 20 cents.
Turnings, Filings and Chips, half the price of Scrap.
Orders for Goods on this list received on or after this date, will be filled at the rate herein stated,
Terms—Net cash. No discount allowed. Interest to be added after thirty days.

ANTIMONY.....14½c. gold

LEAD—DUTY: Pig $2 per 100 lbs.; old Lead, 1¼ cent per lb.; Pipe and Sheet, 2¾ cents per lb.

Spanish	·7c gold
German Refined	6½c gold
English	6¾ @ 7c gold
American	6 @ 6¼c gold
Bar	dis 10 %..... 8¾c.
Pipe	dis 10 %..... 9c.
Tin Lined Pipe	dis 10 %..... 16½c.
Sheet	dis 10 %..... 9½c.
Shot	dis 10 %. Drop, 9¾c. Buck, 10¼c.

BABBITT METAL.

N. P. U.....₩ ℔ 9¼ @ 9c
A., 25c.; B, 20c.; C, 15c.; D, 12c. ₩ ℔.

SOLDER.....No. 1. 15c.; No. 2, 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3¼ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₩ ℔ 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₩ ℔ 12c and upward
Machinery	₩ ℔ 14c
Hammer	" 15c.
Gun or Homogeneous	" 16c

English Steel.—payable in gold, net.

Best Cast	₩ ℔ 17½c
Extra Cast	" 18½c
Round Machinery, Cast	₩ ℔ 10½ @ 11½c
Swaged, Cast	" 19½c
Best Double Shear	" 17½c
Blister, 1st quality	" 14½c
" 2d quality	" 13 c
German Steel, Best	" 11½c
do 2d quality	" 10½c
3d quality	" 9½c
Sheet Cast Steel, 1st quality	" 17½c
" " 2d quality	" 14½c
" " 3d quality	" 12½c
File Steel, Flat and ½ Round	" 12½c
" Square and Round	" 12½c
" Mills	" 13½c
" Taper to 4 inch	" 16c
" Taper 3 and 3¼ inch	" 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.

Silesian, cash	6¾ @ 7c., gold
American "	7⅛ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₩ ℔ 26¼ @ 27c., currency
Straits	₩ ℔ 22 @ 23c., currency
English	₩ ℔ 22 @ 22½c., currency

TIN PLATES, CURRENCY PRICES.

I C 10x14, Prime Charcoal	8·75
12x12, "	9·25
14x20, "	11·00
I X 10x14, "	11·00
12x12, "	11·50
14x20, "	12·00
D C 12½x17 "	8·25
D X 12½x17 "	10·50
For each additional X add	2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$8·50	8·00 @ 8·25	7·75 @ 8·00
I C 12x12	9·00	8·25 @ 8·50	
I C 14x20	9·25	8·50 @ 8·75	7·75 @ 8·00

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 8·25 @ 8·50	7·75 @ 8·00	·50 @ 7·75
I X 14x20	10·50		
I C 20x24	17·00 @ 17·50	16·25 @ 16·75	15·75 @ 16·00
I X 20x28	22·50		
I C 20x28			

ZINC—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2¾c. ₩ ℔.

Sheet	cask 10c
"	Open 10¼c

Paper Stock, Old Metals, &c

(Dealers' Selling Price.)

Canvas linen	6 @
" cotton, No. 1	6¼ @ 6¾
" No. 2	@ 3½
White linen rags, No. 1	6¾ @
" No. 2	4¾ @
Colored	2¾ @
Mixed woolens	3¼ @ 3½
Soft woolens	5¾ @ 6¾
Gunny bagging	2 @ 2¾
Jute Butts	2¾ @ 2¾
Kentucky bagging	5¾ @ 5¾
Book stock	4 @ 4½
Waste paper and scraps	1 @ 1¾
Rope cuttings	1¾ @ 2
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5½ @ 5¾
" No. 2	@ 4
Grass rope	3½ @ 4
Tarred Shaking	1¾ @ 1¾
White Cotar Cuttings, all paper	7 @
" " " muslin lined	5 @
" Envelope	7 @
Hard White Shavings, No. 1	6¾ @
Soft " No. 1	5 @
White Shavings, No. 2	5½ @
Mixed Shavings, part white	4 @ 4¾
Imperfections, No. 2, best folded sheets	5 @
" " 1, Heavy Stock	4¾ @
Book Stock, Mixed	3½ @
" " No. 2, light	2¾ @ 2¾
Prints	1¾ @ 2
Pure Manilas	2¾
Bogus Manilas and Hardwares	1 @ 1¾
Commons	@ 2
Binders' Board Cuttings	1¾ @ 1
Straw Board Cuttings	1¾ @
Woolen Tailor Clips	12 @
Satinet Tailor Clips	1¾ @

Old Metal.

Copper	@ 18
Yellow metal	14 @
Brass	13 @ 14
Heavy Composition	16 @ 17
Old lead, solid	6 @ 6¾
Tea lead	5½
Zinc	@ 4¾
Pewter, No. 1	17
" No. 2	10 @ 12
Solder	@ 6
Wrought iron	per ton $30·00
Machinery iron	per ton $15·50
Light iron	per ton $16·00
Stove plate	per ton $13·00
Burnt iron	per ton $11·00

Paints, Oils, etc.

Paints.

Black lamp—Coach Painters	₩ ℔ 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	70c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75 ..
" " in oil	35 @ 45c
" Chinese dry	65c
" Ultamarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 35c: best, 40c
" " in oil	30c " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14c
Red Lead, American	8¼c
" " English	10½c
" Venetian (N. C.) dry	2½c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 21c
Vermillion, Chinese	1 25, gold
" English	90c., gold
" Trieste	1 10 "
" American, Common	25c
White Lead, American, pure dry	10c
" " in oil	11c
White, Paris, English, prime	in bbls. 3½ @ 3¾c
Yellow Ochre, French	2½ @ 2¾c
" " in oil	asst'd cans, 11c; kegs, 8½c
" " Vermont	in casks 1½c
Yellow Chrome	17 @ 27c
" " in oil	18 @ 28c
Zinc White, American No. 1 dry	9c
" " 1, in oil	11c
" French (Paris)	14c
" " in oil	13c

Oils.

Linseed Raw	₩ gal. casks, 61c. bbl., 63c
" Boiled	" 66c. " 67c
Whale, Crude	73c
" Bleached Winter	
Sperm, Crude	obl. 1·62
" Winter unbleached	" 1·90
" Bleached	" 2 00
Seal, Extra Refined	"
Lard, Pure Winter	" 1·15
" Spring	" 1·05
Cotton Seed, Crude	62
" Southern Yellow	" 67c
" White	"
Neatsfoot, Winter	70c @ $1·10
Natural Lubricating	85c @ 40c

Sundries.

Asphaltum	9c
Benzine	₩ gal. 16c
Chalk	1¼c
" Block	1¼c
Dryer, Patent, Am'n	asst'd cans, 10½c.; kegs, 9c
" English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 47c
" Sheet	20c
Glaziers' Points, Zinc	9c
Gum, Copal	35c
" Damar	25c
" Shellac, English	35c
" " dark	25c
Litharge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	36½c
Whiting, Spanish	85c

Glass.

French Windows—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE THICK.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$7·50	$6·75	$6·25	$5·75
11 x 14 to 16 x 24	8·50	7·75	7·25	6·50
18 x 22 to 20 x 30	10·75	9·75	8·75	7·75
15 x 36 to 24 x 30	12·25	10·75	9·00	
26 x 28 to 24 x 36	13·00	11·50	9·75	
28 x 36 to 26 x 44	14·50	13·25	10·75	
26 x 46 to 30 x 50	15·00	14·00	11·25	
30 x 52 to 30 x 54	16·00	14·00	12·00	
30 x 56 to 34 x 56	17·25	15·50	13·50	
34 x 58 to 34 x 60	18·25	17·25	15·00	
36 x 60 to 40 x 60	20·75	18·75	17·25	

DOUBLE THICK.

SIZES	I.	II.	III.	IV.
6 x 8 to 10 x 15	$12·00	$11·00	$10 00	$9·25
11 x 14 to 16 x 24	13·75	12·50	11 75	10·50
18 x 22 to 20 x 30	17·25	15·75	14·50	
15 x 36 to 24 x 30	19·75	17·25	14·50	
26 x 28 to 24 x 36	21·00	18·50	15·75	
26 x 36 to 26 x 44	23·25	21·25	17·25	
26 x 46 to 30 x 50	24·00	21·50	18·00	
30 x 52 to 30 x 54	25·75	23·25	19 25	
30 x 56 to 34 x 56	27·75	25·00	21·75	
34 x 58 to 34 x 60	29·25	27·75	24 00	
36 x 60 to 40 x 60	32·25	30·00	27·75	

Sizes above—$12·00 per box extra for every 3 inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.
Discount 50&5 %.

PRATT & CO.,

Hardware & Iron Merchants, Buffalo, N. Y.

Manufacturers of the Superior Brand,

BUFFALO FORGED HORSE NAILS.

These Nails are superior, being made with new and improved machinery and actually hammered from the very best brands of **Norway Iron.**

Orders solicited from the Trade.

G. B. WALBRIDGE & CO., New York Agents.

Francis Axe Co.

Buffalo, N. Y.

Diamond Edge Silver Steel

AXES.

"George Washington"

HATCHETS,

Bench Axes, &c.

Orders Solicited.

G. B. WALBRIDGE & CO.,

99 Chambers Street, New York.

Proprietors of the DIAMOND HARDWARE WORKS.

Manufacturers of

Diamond Augers & Auger Bits, Self-Feeding B. S. Drills

STOVE LID LIFTERS, SPOKE SHAVES, &c.

MILLER BROS. CUTLERY a Specialty.

ALSO, AG

Steel.

THREE CLASS PRIZE MEDALS, CLASSES 1, 21, 22, First Exhibition of Industry LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

LOCKER BROTHERS,

(Limited.)

SUCCESSORS TO

SAML. COCKER & SON,

(Established 1752.)

SHEFFIELD, ENGLAND.

MANUFACTURERS OF

CAST, SHEAR, SHEET AND BLISTEB STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

ALSO

GENERAL MERCHANTS.

WM. JESSOP & SONS,

MANUFACTURERS OF

STEEL,

AND IMPORTERS OF IRON

SHEFFIELD, ENGLAND.

PRINCIPAL DEPOTS:

NEW YORK, Nos. 91 and 93 John Street. BOSTON, No. 141 Federal.
ST. LOUIS, No. 714 North Second Street.

AGENCIES

PHILADELPHIA, Jas. C. Hand & Co. PROVIDENCE, Nightingale & Kilton.
CHICAGO, Crerar, Adams & Co. NEW ORLEANS, Folger & Co.
CINCINNATI, Augustus Wessel. SAN FRANCISCO, Huntington, Hopkins & Co.

F. W. MOSS,

Successor to **JOSHUA MOSS & GAMBLE BROS.**

FRANKLIN WORKS, WADSLEY BRIDGE WORKS, WALKLEY WORKS, } SHEFFIELD, ENGLAND.

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

MOSS & GAMBLE **SUPERIOR C. S.** "FULL WEIGHT" **FILES,**

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel.

Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

GENERAL MERCHANT.

WILSON HAWKSWORTH, ELLISON & CO.,

Vienna Universal Exhibition, 1873.

THE MEDAL FOR MERIT

Awarded for Excellence & Perfection in Material & Workmanship.

W. H., E. & CO. have pleasure in announcing the Award of the MEDAL FOR MERIT for their Exhibit of Crucible Cast Steel, Files, Steel Wire, Tools, &c. This is the ONLY Award to any Exhibitor of STEEL WIRE in the British Section.

Manufacturers of

STEEL,

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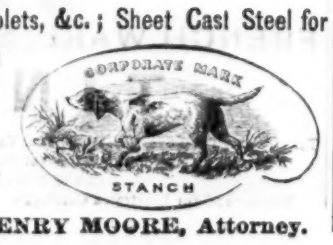

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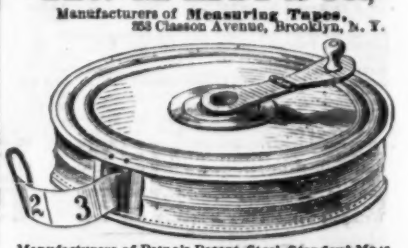

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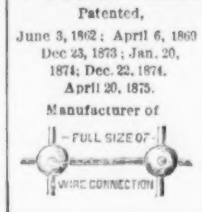

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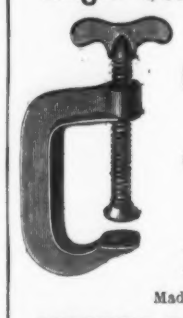

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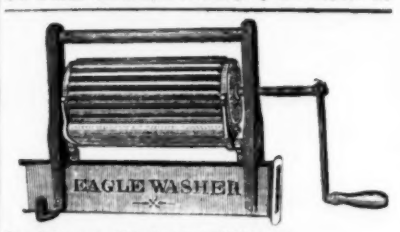

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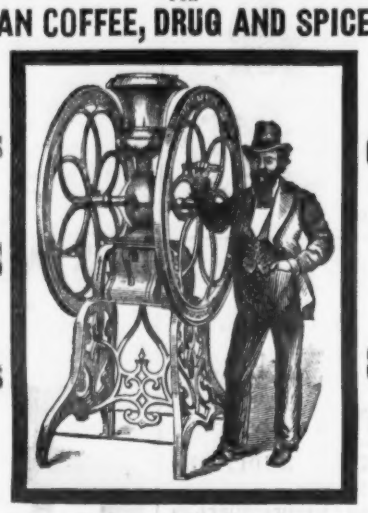

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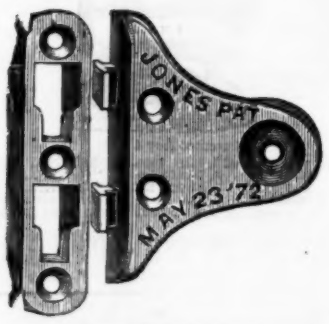

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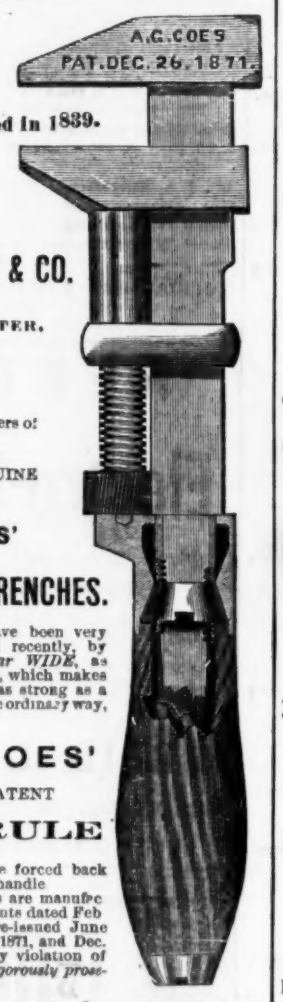

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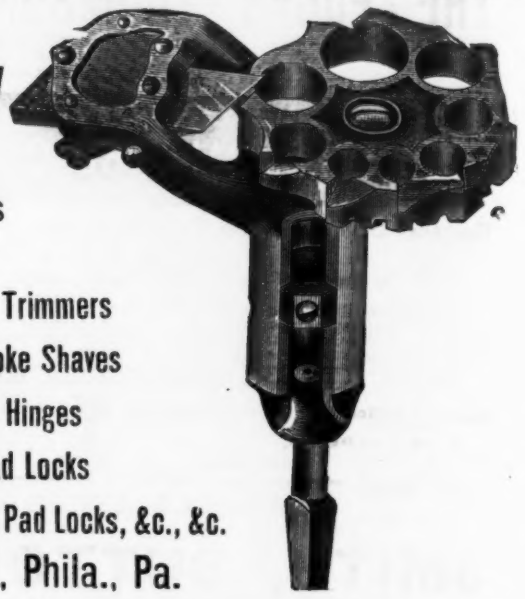
Bonney's Hollow

AUGERS.



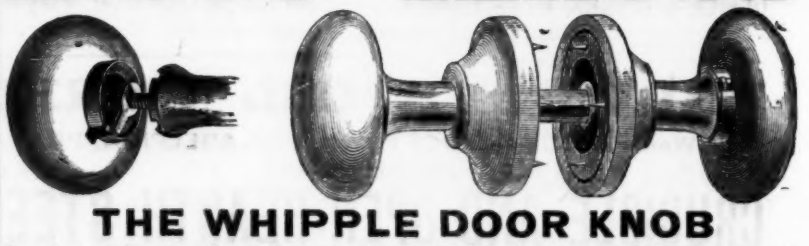
Stearn's Hollow Augers
and Saw Vises
Bonney's Spoke Trimmers
Double Edge Spoke Shaves
Adjustable Gate Hinges
Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

WHIPPLE'S PATENT

Door Knobs



THE WHIPPLE DOOR KNOB

Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

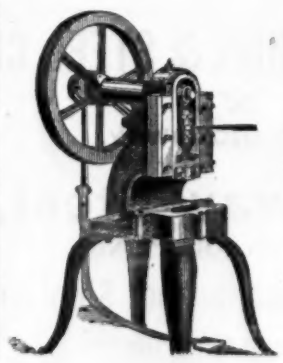
WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circulars fully describing the advantages of this Knob, with Price List, sent on application to

The Parker & Whipple Co.,

WEST MERIDEN, CONN.,

Or 97 CHAMBERS STREET NEW YORK.



A. H. MERRIMAN,

Patent Power

Punching Presses.

Patentee and Sole Manufacturer.

I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

West Meriden, Conn.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ lb 11c
Peter Wright's, ₩ lb. gold.....11½c
Wilkinson's " .....11 c
Eagle.....list 11 cents—dis 20 @ 20&10 %
Apple Parers.—Victor.....per doz $7 75
Domestic " 7 75
Reading " 7 75
Bay State Paring, Coring and Slicing..... " 15 00
" " Peach Parers..... " 10 50
10 d z. lots 5oc. per dozen discount.
Axes.—
Mann s (according to weights)..Per doz. $11 50 @ 10 00
Red Indian, " " " " 11 50 @ 10 50
Red Chiefrain, " " " " 12 00 @ 11 50
Crown Prince " " " " 12 00 @ 11 50
Hunt's " " " " 12 50 @ 11 50
Augers and Auger Bits.—
Benjamin Pierce.....dis 35 %
Douglass' & Ives' Bits.....dis 40&5 %
Connecticut Valley Auger Bits .....dis 40&5 %
Cook s Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bares' Nut Augers.....dis 40& 5 %
Douglass' & Ives' Augers.....dis 40&5 %
Watrous' Ship Augers.....dis 15 %
Bonney s Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—
Landers, Frary & Clark's..... } Sold on Morton's new
Morton's..... } List.....dis 50 %
Chattillon s.....
Common Spring with Hook..... ₩ doz $1 38 @ 2 00
Bells.—bevin Bros. Mfg Co. Light Hand
Bells.....dis 70 %
Common (Tissue Paper Weight).....dis 70&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow.. dis 50&10 @ 50 10&5 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 20 @ 25 %
Douglas Mfg. Co., complete with augers..dis 20 @ 25 %
Common Boring Machines, no Augers.....$4 00 @ 8 75
Angular " ..... 5 00 @ 4 75
Bolts.—Eastern Carriage Bolts .....dis 75 %
Western " " .....dis 75 %
Philadelphia " " .....dis 60&10 %
" Eagle, (Coleman's).....dis 60&10 %
Wrought Snutter, Stanley.....dis 50 @ 50 v 10 %
Braces.—Barber s.....dis 40&5 %
Packus.....dis 50 %
Bartholomew s American Ball... dis 40&10 @ 15&10 %
Snowhard.....dis 50 %
Butts.—Cast Fast Joint, Narrow.....dis 25&10 @ 30&10 %
" " Broad.....dis 35&10 @ 40&10 %
Cast Fast Loose Joint.....dis 45&10 @ 50&10 %
" Acorn, Loose Pin.....dis 4 &10 @ 45&10 %
" Mayers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 45&10 @ 50&10 %
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 40 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
Parker's Blind Butts..... } Discount 65 %; by the case
Buffalo Hdw. Co. " ..... } 65&10%.
Clark's " ..... }
Shepard " .....
Lull & Porter's (Phila.) Hinges....dis 60 %; case, 60&5 %
Garretson's No. 0 Hinges..... } 65&10 %
Cherrytree No. 0 " .....
Chains.—German Halter.....dis 30 %
" Coil.....dis 20 %
Galvanized Pump..... net 13 @ 13½c

Best Proof Coil Chain—							
₩ lb.....	12½	9¼	8¾	8¼	3	7½	7c gold
	2-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 500 lbs., ½c per lb. less Common Chain, ¼c per lb. less.

Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40&10 @ 50 %
Beaty s Framing and Firmer.....dis 2 %
Casters.—Iron Reg.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 40&10 @ 50 %
Iron and Brass Wheel Plate.....dis 40 @ 40&10 %
Porcelain Wheel " .....dis 50 @ 50&10 %
Clothes Wringers.—Universal..... per doz $72 00
Novelty..... " 72 00
Discount on 2 dozen lots. $2 per dozen.
Coffee Mills.—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co. s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty.....dis 15 @ 20 %
Fry Pans.
Tinned.....dis 40 @ 45 %

₩ doz..	$3 50	4 00	4 50	5 00	5 50	6 50	7 50	9 00	10 00
No....	0	1	2	3	4	5	6	7	8

Burnished.....dis 40 @ 45 %

₩ doz..	$3 00	3 25	4 25	4 75	5 25	6 00	7 00	8 00	9 00
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.....new list
" Bastard..... "
" Taper..... "
Butcher's Mill.....$4 75 to £ gold
" Bastard..... 4 75 to £ gold
" Taper..... 4 75 to £ gold
Fluting Machines.
R. F. M.—4 in. rolls.....$4 00 net
" —6 in. rolls..... 4 25 net
Mrs. Knox—4 in. rolls..... 4 25 net
" —6 in. rolls..... 4 50 net
Improved—4¼ in. rolls..... 4 00 net
" —6 in. rolls..... 4 25 net
Hammers.
Yerkes & Plumb's.....dis 15 @ 20 %
Hammond & Son's.....dis 15 @ 20 %
Verce.....dis 20 @ 25 %
Hatchets.
Beatty's.....dis 25 %

Shingling and Half.	₩ doz.	$7 00	7 50	7 75	8 00
	No.....	1	2	3	

Yerkes & Plumb.....dis 15 @ 20 %

Shingling and Half.	₩ doz..	$7 00	7 50	8 00	8 50
	No....	1	2	3	4

Claw....	₩ doz.	$7 50	8 00	
	No.	1	2	3

Hinges.
Strap and T.....dis 50&10 %
Horse Nails.

	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9
Putnam		32	29	26	25	24

On Ausable, Globe and Brundage 1000 lb lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 40&5 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks......dis 50 %
Extra discount for cash 2 %
Scandinavian Pad Locks.

₩ doz.....	$10 50	10 50	12 00	12 00	13 00	15 00	} dis 40 %
No.....	59	59½	60	60½	61	61½	
₩ doz.....	$18 00		18 00		22 00	22 00	} dis 40 %
No.....	62		62½	63		63½	

Trunk Locks......dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 62½ @ 62½&10 %
Lincoln s " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Mortising Machines.—Dixon's.....dis 20 %
Woodruff.....dis 20 %
Stowe.....dis 20 %
Hale's.....dis 35 %
Stuffers.....dis 30 %
Planes.—Auburn Tool Co.. "Benon".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60&10 %
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Pliers.—Philadelphia.....net
Pittsburgh.....net
Rules......dis 60&10 %
Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
Sleeve Rods.—American Pattern.....dis 15 %

₩ doz.....	$5 50	7 00	9 00	10 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₩ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

Hart's Pattern.....dis 50 %

₩ doz.....	$14 50	17 75	21 00	26 50	$1 [illegible]	35 50
No.....	50	100	150	201	250	300

Scythes.—Golden Clipper, Damascus Blade. Boxed and Sharpened.....₩ doz. $10 00
Clipper No. 10, Bright Blade Boxed and Sharpened.....₩ doz. $9 50
Clipper No. 5, Painted Red, Boxed and Sharpened.....₩ doz $7 00
Cast Steel Scythes.....$7 50 @ 8 00
German " .....6 50 @ 7 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 15 %
Disston's Hand.....dis 15 %
W. McNiece & Bro. Cross-Cut & Circular, new list..dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
Shovels and Spades.
Rowland's Plain Back, Changed Jan. 14, '75...dis 33⅓ %
" Back Strap " " ...dis 33⅓ %
Oliver Ames & Sons.....dis 40 %
Bradley Shovel Co.....dis 20&5 %
Sad Irons.—Richmond (polished face).....per lb. 3½c
Richmond (polished face)..... by the cask " 3¼c
Stone.—Arkansas Oil, No. 1.....₩ lb $
Turkey Oil, No. 1..... "
Washita Extra.....net " 3½c
" No. 1.....net " 3c
" " 2.....net " 15c
..... " 5¼c

Screws.
United States and others in Combination.....dis 40 %
Keystone, not in Combination.....dis 40&5 %
Spoons.—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 @ 50&10 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 60&10 %
Torry's Door.....dis 60&10%
Stocks and Dies......dis 10&5 %
Stove Polish.—Gem.....₩ gross, $5 00
Onyx.....$5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 75 @ 75&10 %
" " by the case...dis 72½&2½ %
Trunk, Clout and Finishing Nails.....net to 10 %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " " ...dis 30 @ 35 %
Vises.—Solid Box, currency..... ₩ lb 13½c
Wrenches.—Coes Genuine.....dis 10&5 @ 15&10 %
Coes Imitation Wrought Bar.....dis 50&20&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tatts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....(Advanced April 24th)..dis 47½ %
No. 19 to 26.....dis 50 %
No. 27 to 36.....dis 52½ %
Coppered 0 to 12.....dis 15 %
Tinned Broom Wire.....dis 15 @ 20 %
Galvanized Wire No. 1 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
November 5, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....1 50
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 40 %
Bells, Cow—Kaw s Genuine.....dis 35 %
Braces—Bit, Spofford's Patent.....dis 50 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Pat.dis 35 % 4 mos., 35&5 % 30 dys
Belting—Rubber.....₩ lb 10c
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1 25
" Rutherford.....$1 00
Can Openers—Sprague's.....dis 50 %
Cases—Parlor Coal Hod.....dis 15 %
Chalk—White, Carpenter s.....₩ gross, 57c
Red, Carpenter's.....90c
Chisels—Firmer Socket.....dis 60, 10&10 %
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable.....₩ lb 9½c
Cutters—Meat, "Hales".....35 %
Egg Beaters—"Peerless".....per doz $3 00
"Centripetal".....per doz 5 00
Elbows—Corrugated.....dis 10 %
Adjustable.....dis 10 %
Files—Maischoss Bros.....dis 20 %
Fluters—Gereva Hand.....dis 50 %
Freezers Ice Cream—" Champion".....₩ doz. $15 00
Hammers—Henry W. Kip's.....dis 12 %
Hinges, Gate—Shepard's.....dis 30&10 %
Hinges—Window Blind—
Shepard s and Standard.....dis 60, 10&5 %
Hods, Coal—Plain, Black and Galvan'd...new list dis 15 %
Funnel, Black and Galvanized.....dis 15 %
Fancy and Helmet.....dis 15 %
Sad Irons.....3½c
Kettles—Brass.....
Copper, "Hand Made".....₩ lb. 35c
Enameled.....38c. @ 40c.
Knives, Drawing—Oval No. 1.....dis 60, 10&10 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless," No. 1 ... 5 ... 10
₩ doz $25 00 $10 50 $13 75 dis 10 %
Tuquiar.....$11 00
" with Guards.....11 50
Machines—Apple Paring, "Keystone".....7 75 ₩ doz
Machines—Boring, Snell's.....dis 20 %
Mills, Coffee—Box and Side, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 15 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 20 %
Shoe.....dis 7½ %
Cut, "Chesapeake," Rod.....dis 7½ %
Horse, Ausable.....No. 5 ... 7 ... 8 ... 9 ... 10
30 ... 27 ... 25 ... 24 ... 23 ... 22c
" " Pointed & Polished.....add 1c ₩ lb
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 ... 7 ... 8 ... 9 ... 10
21 ... 19 ... 18 ... 17 ... 16c
Packing—Rubber.....dis 30 @ 10 %
Paint—White Lead, U. S. Gov't.....₩ lb 8½c
Pans—Dripping.....₩ lb 10c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 30&5 %
Flat Head, Brass.....dis 30 %
Sieves—Wood, Hoop Iron.....$1 25
Tinned.....$1 75
Skates and Straps—White's.....dis 30 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 50 %
Britannia.....dis 50&10 %
G. S. Hall, Elton & Co.....dis 50&10 %
Squares—Steel and Iron.....new list 50 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 25 %
Stove Polish—Gem.....₩ gross, $4 50
" Dixon's.....6 00
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Tea Trays.....dis 15 %
Tools—Machinists' and Tinmens'.....dis 10 %
Vases—Palace Urn.....dis 15 %
Vises—
Parallel, Buffalo...Old pattern, dis. 30 %; new, do. dis 20 %
Ware—French, Tinned and Iron.....dis 20&10 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 40 %
Wire—Bessemer Steel.....dis 10 %
Tin Plates.—Add for each X.....2 50

10x14, IC. Charcoal...	$9 50	14x20 C. terne.....	$8 75
12x12. " ...	10 00	20x28 C. " ...	19 50
12½x17, " ...	9 00	20x28 X. " ...	24 00
14x20. " ...	10 50		

Pig Tin—Straits.....25c @ 26c
Bar Tin.....27c
Solder—No. 1, Crook's.....16 c
Sheet Zinc—
" Lasalle '.....570 ... 500 ₩ casks
$10 50 ... 10 80 ₩ 100 lbs
Sheets.....$10 50
Babbitt Metal.....₩ lb 12c
Iron Wire—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 25 %

Tinned Broom,	Nos.	20	21	22	} dis 35 %
		20c	21c	21c	

Copper—Sheathing 14 @ 18 oz.....₩ lb 30c
Planished.....₩ lb 37c @ 39c
Bottoms.....₩ lb 32c
Bolts.....₩ lb 31 @ 33c
Brazers' Sheets.....₩ lb 31 @ 33c
Sheet Iron.—
18 Common.....$4 05
24 Common.....4 25
26 Common.....4 45
24 W. D. Wood & Co., Smooth Finish.....5 25
Planished.....A. 13c ... B. 11c
Gen. Russia, No. 1 stained.....16c
" clean.....15c
Galvanized.....dis 33⅓ %

CINCINNATI.

Reported by Sellers & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.
November 1, 1875.

Tin Plate.—I. C. 10x14 Charcoal.....$9 50 @ 10 00
I. X. 10x14 Charcoal.....12 00 @ 13 00
I. C. Terne 14x20.....9 75 @ 9 8
I. C. Terne 20x28.....20 00 @ 21 00
I. C. 20 inches Continuous.....21 00
Block Tin.—
Pig.....₩ lb 25c
Bars.....₩ lb 26c
Solder.—
A I.....₩ lb 16c
Roofing.....₩ lb 17c
S. & Co.....₩ lb 19c
Lead.—Pig.....₩ lb 7½c.
Bar.....₩ lb 8½c
Copper.—
Ingot.....₩ lb @ 34c
Planished.....@ 38c
Sheathing.....@ 31c
Copper Drops.....@ 34c
Sheets.. 6 to 7 lb.....@ 37c
" 8 to 9 lb.....@ 35c
" 10 to 12 lb.....@ 33c
" 13 lb. up.....@ 31c
Copper Bottoms.....@ 33c
Zinc. Casg, 500 to 1000 lbs.....₩ lb 10½ @ 10¾
Case, 100 lbs.....10¾ @ 11 c
Slab.....7¼c
Brass.—Roll, No. 8 to 20.....₩ lb 36c
Roll, No. 30 to 36.....35c
Wire, No. 0 to 20.....35c
" 20 to 25.....40c
Babbit Metal.—Sellew & Co.....36c
Allens'.....20c
Market.....12c
Antimony.....₩ lb 12c
Bismuth.....$4 00
Nickel.....$3 00
Russia Iron.—Bundle.....₩ lb 16c
Less than bundle.....₩ lb 18c
No. Stained.....₩ lb 15c @ 16c

Sheet Iron.	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	4c	5 10c	7 10
22 to 24	3 90c	5 80c	6 90
26	4c	5 80c	6 90
27	4 90c	5 90c	7¼
30	5c		

Galvanized Iron.—Full bundles.....dis 30 %

Nos. 16 to 20	12c	No. 26	14c
22 to 24	13c	27	15c

Bar Steel.—Silver, ₩ lb 16c Crescent, 21c.
Iron Wire.....dis 33⅓ %
Enameled Ware.....dis 50 %

One Piece Corrugated Elbows.....dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₩ doz $2 50	4½ inch.....	₩ doz $5 00
5 "	" 3 50	5 "	" 7 00
5½ "	" 4 50	5½ "	" 7 50
6 "	" 5 50	6 "	" 12 00
7 "	" 6 50	7 "	" 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₩ doz.		₩ doz.
2 inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₩ lb 8½c
American Broilers.....₩ doz. $13 50
Tinmen's Machines.....dis 5 %
Sad Irons.—I X L s.....₩ lb. 31½c
Brass Kettles.—Ansonia.....45c
Dog Irons.....3 c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 2½c. rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4½c ₩ lb net
Iron Wedges.....4½c ₩ lb net
Norway Nail Rods.....8½c ₩ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4½c ₩ lb net
Beetle Rings.....8 c ₩ lb net
Fence Pickets—
⅝ round, bent to shape, 25c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts.....55 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts.....20 % off net
Machine and Square Head Bolts.....40&10 % off net
Coach and Lag Screws.....40&10 % off net
Bolt Ends.....40 % off net
Pat. Hot Pressed Square and Hexagon Nuts.
small sizes, from 3-16 to ⅝ in.....8½c ₩ lb off net
large sizes, from 7-16 to 2 in.....6½c ₩ lb off net
Washers, all made from new band iron,
small sizes, from 3-16 to ⅝ in.....9½c ₩ lb off net
Washers, all made from new band iron,
large sizes, from 7-16 to 1⅜ in.....7½c ₩ lb off net
Nuts and Washers in 25 lb. boxes, ½c ₩ lb ex. Nuts and Washers in lots less than one keg each size, ½c ₩ lb ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ lb ex. net p ices.
Standard Caps, for Plows.....5½c. ₩ lb net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 3½c ₩ lb net; ⅞ in. diam. 3½c ₩ lb net; ¾ in. diam. 3½c ₩ lb net.
Patent Headed Harrow Teeth, packed in boxes ½c ₩ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₩ lb net; 9-16 in. diam. 6c ₩ lb net; ½ in. diam. 7c ₩ lb net. 1c ₩ lb extra when less than 1 keg of each size is ordered.
Strap & T Hinges...33⅓&10 % off net, delivery as custo'ry
Screw Hitching Rings.....$5 25 ₩ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ lb 3½c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4 c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. from 1¼ to 4 ft. long " 5 c net
Bridge bolts with upset ends.....½c. ₩ lb extra
Wrought iron plates, punched.....4½c. ₩ lb net
Cast Iron Washers.....₩ lb 3½c net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at	Screw End,	₩ set of	8	bolts..	45c
12 "	½	" "	8	" ..	55c
10 "	9-16	" "	8	" ..	65c
12 "	9-16	" "	8	" ..	70c
14 "	9-16	" "	8	" ..	80c
10 "	⅝	" "	8	" ..	80c
12 "	⅝	" "	8	" ..	80c
14 "	⅝	" "	8	" ..	90c
16 "	⅝	" "	8	" ..	1 00
18 "	⅝	" "	8	" ..	1 10
20 "	⅝	" "	8	" ..	1 20

5c ₩ set for each additional inch over 14 in made. All lengths
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₩ set of four pieces.....30c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....45c
" " 3 " " 50c
" " 3¼ " " 55c
" " 3½ " " 60c
Wagon Brake Ratchets, each.....14 c
" " finished with guard, each..40 c
Wrought Hammer Straps, heavy pattern, each.....13 c
" " light " each.....12 c
" Rub Irons, each.....9 c
Stay Chain Hooks, each.....5½c
Double and Single Tree Clips, figure 1, each.....8 c
" " " 2, each.....9 c
" " " 3, each.....11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each.....8c
Wagon Clevis, including Pin, complete, each.....10c
Pole Caps, each.....24c
Single Tree Hooks, Nos. 1 and 2.....4½c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 15 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on, ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¼c net
" " with ⅝ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1½ in. diam.....₩ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....4½c net
Wagon Rivets, 3-16 in. diam., all lengths.....9¼c net
" ¼ to 1 inch long.....₩ lb 1c extra
" & Nails, in 5 lb paper boxes.....1c extra
" in 25 lb wood " ½c extra
Wagon and Hinge Nails, ¼ in.....₩ lb 17 c net
" " 3-16 in..... " 19 c net
Wagon Rivets and Nails, in less lots than one keg each size.....½c extra
Double Tree Plates.....5c net
Coupling " .....5c net
Tongue " .....8½c net
Neck Yoke Plates.....10½c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ lb as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in. ₩ lb 10½c net. ¼ in.. 11½c. net
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

(Reported by Messrs. Jewett & Root.)
Nov. 8, 1875.

Tin Plate.—Best Charcoal

IC. 10x14.....	$ 9 75	IX. 12x12.....	12 25
IX. 10x14.....	12 25	XX. 12x12.....	14 75
XX. 10x14.....	14 75	IC. 12x20.....	10 25
IC. 12x12.....	10 25	IX. 14x20.....	12 75
IX. 12x12.....	12 75	IC. 14x20.....	10 75
IC. 14x20.....	10 75	IX. 14x20.....	13 25
IX. 14x20.....	13 25	XX. 14x20.....	15 75
XX. 14x20.....	15 75	XXX. 14x20.....	18 25
XXX. 14x20.....	18 25	XXXX. 14x20.....	20 75
Dx. 100 Plate.....	9 25	DX.....	11 75
DXX. "	14 25	DXXX "	16 75
DXXX 100 Plate..	19 25	IX, 14x14.....	19 25
IC, 10x14 W.....	9 25	IX, 10x14 W.....	11 75

Roofing Tin.—Best Char.

IC, Terne, 14x20.....	$ 9 00	IX " 14x20.....	11 00
IX " 20x28.....	24 00	IC, Terne, 20x28.....	19 00

Coke Tin.—

IC, 10x14 Coke.....	$ 9 00	IX. 10x14. Coke.....	11 00
IC, 14x20. " ...	10 00		

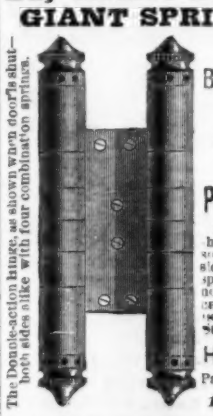
Solder.—No. 1..... 16c
No. 2..... 15c

Pig Tin.—

Large Pigs.....	24c
Small Pigs.....	25c
Bars.....	26c

Bright Wire.
65 lbs. in bdl.....dis —
Copper.—
Sheathing.....31c
Copper Bottoms.....32c
Planished Copper.—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8.....40c
" " No. 9.....40c
Sheet Iron.—
No. 18 Am. Com.....4 00
No. 24 Am. Com.....4 20
No. 26 Am. Com.....4 40
No. 27, Am. Com.....4 60
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $5 00
" 21 to 24..... 5 20
" 25 & 26..... 5 40
" 21 to 24 Charl.. 6 70
" 25 & 26 " .. 6 90
RUSSIA.
Genuine.....17c
Imitation.....14c

Buy House's Double Action GIANT SPRING HINGE



The Double-action hinge, as shown when door is shut—both sides alike with four combination springs.

FOR
Banks and Offices,
CHURCHES,
School Houses,
And all
Public Buildings.

It has no equal. It swings the door both ways, forms a solid attachment on each side. Has four combination springs acting together, cannot settle nor sag. Will carry any weight, and is decidedly the Finest, Strongest, and Best made.

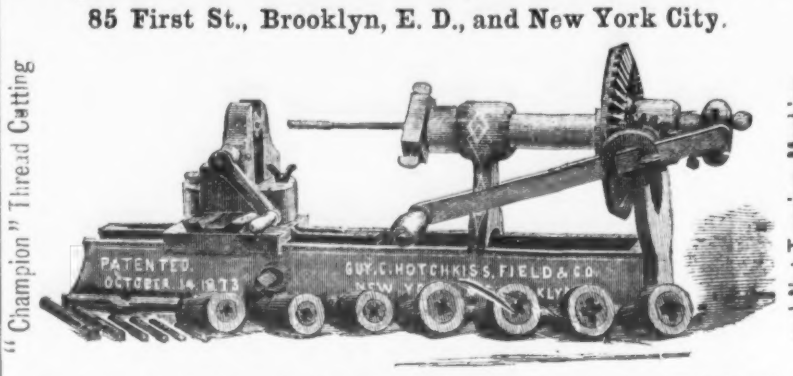
HOUSE BROS.,
Patentees & Manufacturers.
194 Broadway, N. Y.

TACKLE BLOCKS
BURR & CO.,
Manufacturers of Waterman and Russell's
Patent Iron Strapped Blocks,
ALSO, MANUFACTURERS OF
ROPE STRAPPED BLOCKS,
31 PECK SLIP, NEW YORK.

Guy C. Hotchkiss, Field & Co.

85 First St., Brooklyn, E. D., and New York City.

"Champion" Thread Cutting and Nut Tapping Machine.



This machine has revolving and sliding jams, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

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And Manufacturers of

Sunny Side Stove Polish.

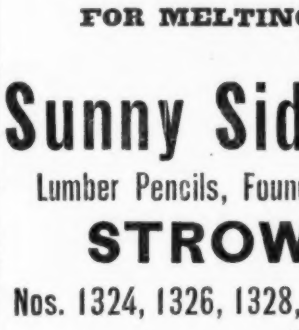
Lumber Pencils, Foundry Facings and Lubricating Plumbago.

STROW, WILE & CO.,

Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila

GENERAL AGENTS:

Messrs. HALL & CARPENTER, 709 Market St., Phila.



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Hammer Pointed, Polished & Blued

HORSE NAILS,

FROM

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Orders promptly filled at lowest market rates.

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Recommended by over 20,000 Horse Shoers

All nails made from best NORWAY IRON, and warranted

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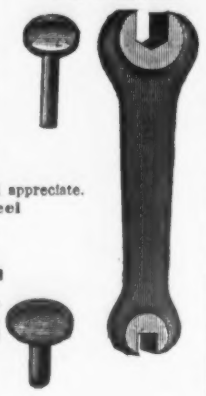
Vienna, 1873

Forged from Bar Steel And Hardened

Under Billing's Patent Process.

For Progress.



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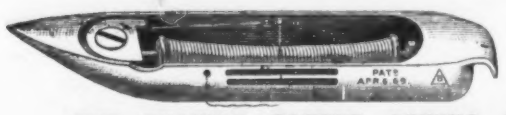
and something that every machinist and Tool Maker will appreciate.
Also, all Descriptions of **Wrought Iron & Steel**

DROP FORGINGS.

For Machine Handles, Lathe Wrenches, Spinning Rings, Marlin Spikes. Clinch Rings, Thumb Screws. Thumb Nuts, and Pa of Drill Chucks, Sewing Machines. Gun-, Pi and

Machinery Generally.



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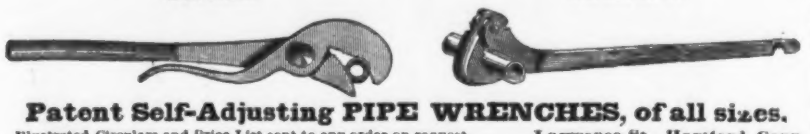

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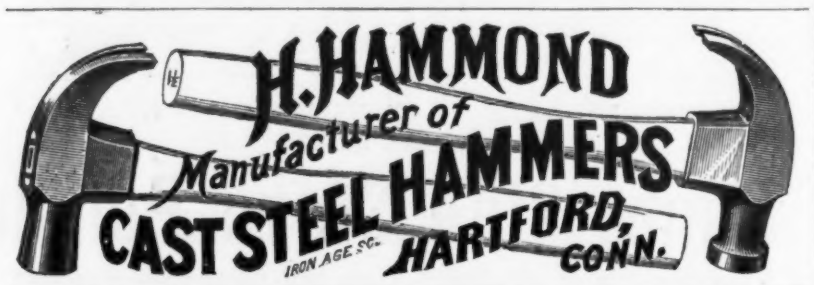

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Coes & Taft's Pat. Wrenches.
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WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good marg for dealers. We are prepared to furnish them in large quantities. Manufactured by

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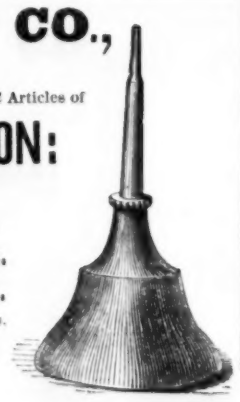

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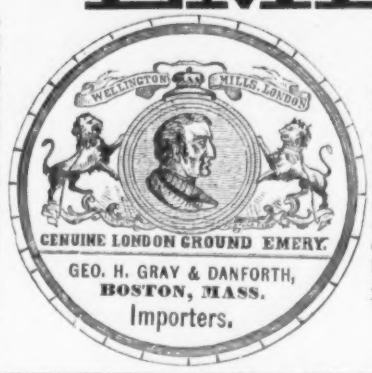

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They can be grasped by the **handle directly over the top,** or **by the handle back of the comb,** as commonly used.

THEY ARE THE

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No Malleable Iron being used in their construction.

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They have no Wire

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Catalogues furnished on application.

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PORTABLE FORGES.

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COSTING FROM $16·00 TO $75·00.

We desire to call your attention to our new Forge, No. 12. They are especially convenient for Boiler Makers' repairs, weighing only 50 lbs.; they can be easily carried around the country, and will make a fire hot enough to melt ¾ or 1 inch iron in two minutes. They are a very useful tool for Machinists to set up on their work bench—always ready and handy for mending and tempering tools, and like work—and are so cheap that every mechanic can afford to complete his "kit of tools" by owning a Forge. We make 28 sizes of Portable Forge, designed for all purposes of metal working. Send for catalogue to

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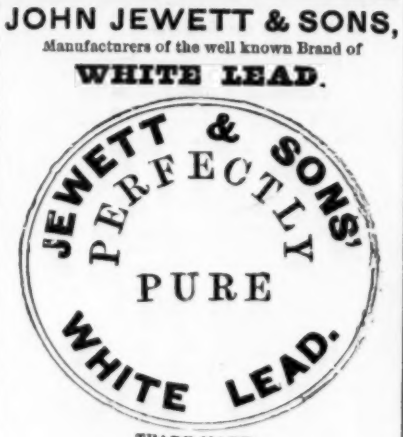

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☞ Send for Circulars. See Notice page 9 Nov. 11.

REPORT OF JUDGES

In Department V, Group 3, at the 44th Exhibition of the

AMERICAN INSTITUTE,

Held in the City of New York, Oct., 1875.

No. 318, Drawing, Drop & Punching Presses.

THE STILES & PARKER PRESS CO.,

Of Middletown, Conn.

The machinery exhibited by these makers is of a character that calls for special commendation. In addition to their well known punching presses, to which a new feature has been added in a press adjustable to an inclination for discharging work left above the die, there are exhibited by them a combined punch and shears, a drawing or blanking press, and a drop.

In all these there is shown the highest mechanical culture, applied to meet every practical requirement, to avoid every practical difficulty, and to enlarge the range of application of the machines, by devices which are at once simple, elegant, and effective.

Your committee would unhesitatingly recommend for this exhibition the "Medal of Progress," but find such award debarred by the rule of the Institute, forbidding such award unless a Silver Medal has been previously awarded We, therefore, respectfully recommend the award of a Silver Medal.

Silver Medal Awarded.

A true copy from the Report on file.

JOHN W. CHAMBERS, Sec'y.

WOODEN TOOTH

Curry Comb.

The Best yet Invented.

CHEAP AND DURABLE.

Is Pleasant to the Horse, and does not injure the Brush.

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DUPLEX CURRY COMB.

We call the attention of Hardware Dealers to our Double Curry Comb, comprising a fine and coarse side; or virtually two combs in one. It is useful, durable and novel, and needs no argument to convince any one of its practicability. It sells on sight, and is bound to supersede all other combs. We want one reliable dealer in each state or large city to handle it. Correspondence solicited.

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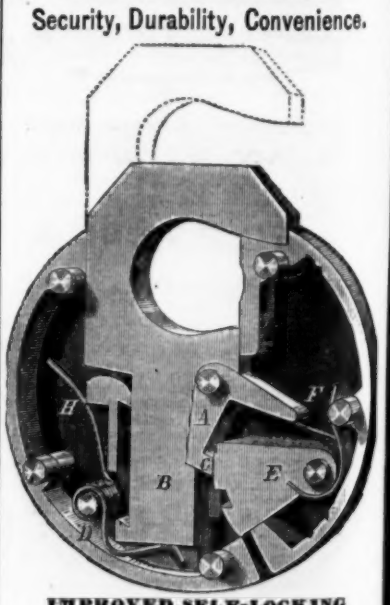
Security, Durability, Convenience.



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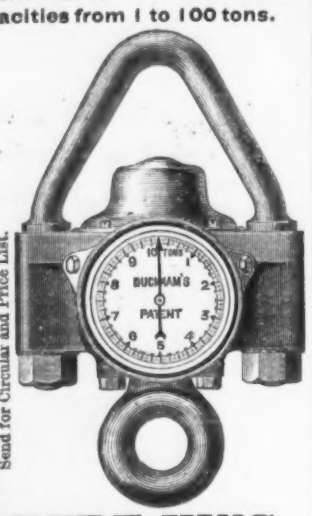
Suspended Self-Indicating

WEIGHING MACHINE.

Capacities from 1 to 100 tons.



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FORGING of all kinds,

Such as Steamboat, Stationary Engine and Crank Shafts, Locomotive, Truck and Car Axles, Crank Pins, Piston and Connecting Rods; Also, Hammered Bar Iron of all sizes and lengths.

Locomotive, Truck and Car Axles a Specialty.

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The Backus Water Motor,

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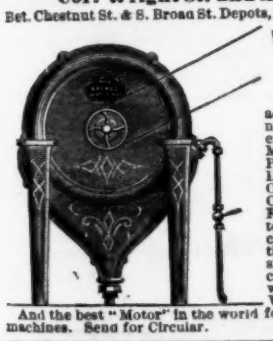

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These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Church Organs, Sausage Cutters, Ice Cream Freezers, Elevators, Hoisting Machines and everything requiring similar power, in cities or towns where there are Water Works.

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THE BEST IN THE WORLD

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FOR

Railways, Machinists and Amateurs,

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FINE TOOLS

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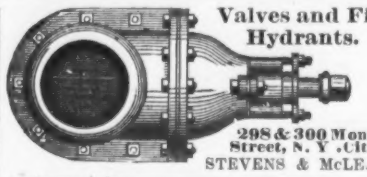
Synovial Lubricating OILS.

The most Durable, Reliable & Economical Lubricant in existence;

applicable to every grade of machinery. Send for Circular and Price List.



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Manufacturer of

HAIR AND WOOL

Boiler Felting.

Boilers Measured & Estimates Furnished.

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Sledges, Hammers,

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AND THE STANDARD

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All warranted the Best Solid Cast Steel.

Grindstones, Emery, &c.

Walter R. Wood,

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SOLE AGENT OF THE

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283 & 285 Front Street, New York.

Family GRINDSTONES.

IMPROVED READING PATTERN.

½ doz. in case.

6 inch diam., per doz.	$9 25
7 " " "	10 50
8 " " "	11 25
9 " " "	12 75
6 to 10 inch, not mounted, per doz.	2 50

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And 456 Fifth Avenue, Chicago, Ills.

BRADY MFG. CO.,

Manufacturers of

Emery Wheel Machinery

Keep constantly on hand everything pertaining to the

USE OF EMERY.

Automatic Knife Grinders.

Universal Grinding Machines,	Belting Machines,
Emery Grinders,	Roll Grinders,
Buffing Machines,	Reamer Grinders,
Polishing Jacks,	Rag Wheel Jacks,
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OIL STONE

BOYD & CHASE,

388 to 406 East 107th st., N. Y.,

The largest manufacturers in the world of

ARKANSAS & WASHITA OIL STONE.

Also, *Hindostan, Sand* and *other Stone.*

Send for circular. Orders solicited from the trade. Superior Hindostan Stone finished especially for Retail Trade.

EMERY WHEELS AND MACHINERY

Upon which to run the same, of all kinds.

EMERY Emery Cloth, Mill Stone CEMENT. TRADE MARK. DIAMOND Tools, Oil Stones

Soapstone Register Borders.

For particulars, address,

UNION STONE CO.,

15 Exchange and 26 Devonshire Streets, Boston, Mass.

And Shaped Diamond Carbon Points, indispensable for Turning Emery Wheels, Grindstones, also Truing up hardened Steel and Paper Calender Rollers, &c. Address, J. DICKINSON, Patentee, *64 Nassau Street, New York.*

BUFFALO

Bellows Factory and Planing Mill.

ESTABLISHED 1852.

JOSEPH CHURCHYARD,

Contractor, Builder

AND

Manufacturer,

CLINTON, cor. ADAMS STS.,

Buffalo, N. Y.

SASH, BLINDS, DOORS,

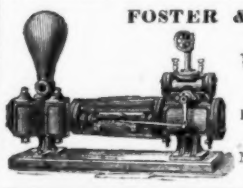
Cisterns, Tanks, Stairs, Hand Rails, Newels, Mirror Frames, Mantels, Curtain Cornices, Book Cases, Veneered Doors, Mouldings, and complete interior and exterior finish for houses.

ROUGH AND PLANED LUMBER,

Flooring, Siding, Shingles, Lath and Fence Posts.

Blacksmiths' & Moulders' Bellows.

Standard SCOTT'S Bellows.



FOSTER & JAMIESON,

Manufacturers of

The Jamieson Patent Steam Pump, and Foster's "Excelsior" Rotary Pumps.

No. 13 Adams Street, Brooklyn, N. Y.

BOSTON.

(Reported by Macomber, Bigelow & Douse, 156 to 164 Oliver St.)

Anvils.—"Eagle American".....per lb. 10c; dis 20 %
Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %
Axes.—Blue Jacket.....11 00
Racer.....10 00
Boy's Handled Blue Jacket.....11 00
Axe Handles.—Wadleigh's Oak-
A (Extra) $2 50. B (No. 1) $2 00. C (No. 2) $1 50 ₱ doz
Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1.....$1 70
Fancy Body, Patent Leather, Leather Bound, White Metal, 36, No. 1.....1 80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1.....88
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1.....2 50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1.....3 88
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1.....3 50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1.....per pair, 50c.
Common, 6, No. 1.....45c.
Bird Hinges.—
Orr or Washburn's.....per hundred sets $9 50
Blind Fasts.—
Orr or Washburn's.....per hundred set $6 00
Bolts.—Carriage, Phila., "Girard Works....dis 50&10 %
Borax.—Best Refined.....₱ lb 15c
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $4 75
Common, Snell's quality.....each 3 75
Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 50 %
Amidon.....dis 50 %
Brackets.—Star Bronzed.....new list net
Star Japanned.....new list net
Store Shelf.....new list net
Brass Faucets.—L. F. & C.....dis 25& 10 %
Brushes.—Horse, Patent Metallic.....per doz. $4 50
Butts.—Union Drilled Loose Joint.....dis 45& 10 %
" " Wire Fast Joint.....dis 25& 10 %
" " Acorn Loose Joint...dis 45& 10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....revised list, dis 30 %
Wrought Narrow Butts.....reduced, dis 30 %
Cards.—
Curry Cards, No. X, per doz., $0 75.....dis 30 %
Horse " No. X, " 0 80.....dis 30 %
Wool " No. 9X, " 2 50.....dis 15 %
Cotton " No. 10, " 3 50.....dis 10 %
Cartridges.—U. S. Cartridge Co.....dis 60 %
Chisels.—"Buck Bros.' Shar'k Goods.....add 22½ %
Socket.....add 25 %
Churns.—Lightning—
Redheffer patent.....3 4 5 6 gall
per doz $22 00 $27 00 $31 50 $36 00
Coal Hods......dis 40 %
Fancy Japanned, No. 4, 15 in., $8 00; 5, 16 in., $9 00; 6, 17 in., $10 00.
Fancy Galvanized, No. 4, 15 in., $11 50; 5, 16 in., $13 00; 6, 17 in., $14 00.
Perfection, Jap'd, No. 4, 15 in., $12 00; 5, 16 in., $13 00; 6, 17 in., $14 00.
Perfection, Galv'd, No. 4, 15 in., $15 00; 5, 16 in., $16 00; 6, 17 in., $17 00.
Morning Glory, Jap'd, No. 4, 15 in., $12 00; 5, 16 in., $13 00; 6, 17 in., $14 00.
Morning Glory, Galv'd, No. 4, 15 in., $15 00; No. 5, 16 in., $16 00; No. 6, 17 in., $17 00.
Compasses and Dividers.—Bemis'.....dis 40 %
P. S. & W.....dis 30 %
Cordage.—Manila (usual trade dis.).....₱ lb, 14½c
American Tarred Hemp Lath Yarn.....₱ lb. 10c
Corn Hooks......per doz $2 75
Cow Ties......dis 10 %

No. 30, Open Ring,	3	foot, No. 6,	with Toggle	$3 70
No. 35, "	3	" No. 6,	" Snap	3 90
No. 40, "	3½	" No. 6,	" Toggle	4 00
No. 45, "	3½	" No. 6,	" Snap	4 30
No. 50, "	4	" No. 5,	" Toggle	4 70
No. 55, "	4	" No. 5,	" Snap	5 00
No. 60, "	4½	" No. 4,	" Toggle	5 20
No. 65, "	4½	" No. 4,	" Snap	5 40

Crow Bars.—Iron. Steel Points.....₱ lb, 5½c
"Sweet" Steel Bars.....₱ lb 11c
Brown's Steel Bars.....₱ lb 10c
K. P. & Co. Extra Drill Steel.....₱ lb 15c
Dividers.—Cook's Nickel Plated.....dis 15 %
Door Springs.—Moseley—

Per doz.	$9 00	12 00	15 00	18 00	24 00
No.	0	1	2	3	4

Torrey's.....$3 00
Gem.....1, $3 50; 2, $2 50; 3, $2 00 ₱ doz
Egg Beaters.—Lightning, Redheffer pat., pints, $5 50; 1 qt., $8 00; 2 qts., $12 00 per doz.
Emery.—Alden.....₱ lb 6½c
Wellington Mills.....₱ lb 10c
Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 35 %
Nicholson.....new net list
Wheeler, Madden & Clemson.....$5 to £
Stubb's Tapers, genuine, 3 in., $1 50; 3½, $1 62½, 4, $1 75; 4½, $2 13; 5, $2 50.
Funnel Irons.—$2 50 2 50 2 50 $3 25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3 50 3 75 4 00
5, 5½, 6 inch.
Hammers.—Maydole.....dis 12 ½
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $9 75
$11; 1½, $9 75. bell face, No. 1,
Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....dis 30&5 %
Hatchets.—Underhill Edge Tool Co.....dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4 75; 1, $5 25; 2, $5 75
Claw.....1, 5 75; 2, 6 25
Lathing.....1, $5 50
Axe Pattern.....1, $7 00; 2, 7 50
Broad.....0, $5 75; 1, $6 50; 2, $7 50; 3, $9 25; 4, $10 75; 5, $12 75; 6 $14 75
Hinges.—Strap and T. Stanley Works.....dis 40 %
Plate, Loose and Fast Joint.....₱ lb 6c
Wrought Screw Hook.....₱ lb 6½c
Knobs.—Young's imp. Silvered Glass.....dis 45 %
Lanterns.—Tubular No. 0.....$ 9 50
Guarded, No. 74, (with kerosene oil and candle burners).....5 50
Anti-Tubular.....8 00
Lead.—Sheet, 9½c.; Pipe, 9c.....less 10 %
Locks.—Norwalk Lock Co.....reduced list, dis 40&5 %
Mattocks.—
K. P. & Co., axe finish, long cutter.....$13 00—net
Short cutter.....12 75—net
Meat Cutters.—"Miles's" Challenge.....dis. 20 %
No. 1, $22 00; 2, $30 00; 3, $40 00.
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₱ lb
Nails.—10d and larger.....$3 25 net
Nail Pullers.—Little Giant—Small.....per doz., $22 00
Little Giant—Large.....30 00
Padlocks.—Wilcox.....reduced list, dis 40&5 %
Paper.—Tar'd Sheathing.....₱ lb 2 c
Dry Sheathing.....3 c
" " "Beaver Brand" Rosin Sized..4½c
Tar'd " " " 3 c
Felt " " " 4½c
Virginia Cane Fibre.....4¼c
Picks.—h. P. & Co., Solid Eyes.....5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hatand Coat all wood—
2 in.....₱ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
" Partridge," 6 square tine.....₱ doz $12 00
Shumway & Co., 6 round tine.....₱ doz 9 00
Pulleys.—Axle.....
Frame Pol. Wheel....No. 150, 50c., 1¼ in.; 16, 38c., 2 in.
Common Axle.....No. 18, 34c., 1¼ in.; 26, 40c., 2 in.
Milled Axle.....No. 2, 42c., 1¼ in.; 2, 50c., 2 in.
Nashua Pat. Axle Bronzed Face...1¼ in., 80c; 2 in., 90c
Cast Steel Axle.....2 in., $1 00
Pulley Blocks.—"Best Boston Make".....net
Common Strapped Blocks—

	4	6	7	inch.
Single,	75c.	88c.	$1 00	$1 13 each.
Double,	$1 00	1 12	1 25	1 60 "

Inside Iron Strapped Blocks—

5	6	7				inch.
Single, $1 00	1 13	1 38	2 00	2 25	2 75	each.
Double, 1 88	2 50	2 63	3 63	4 00	5 00	"

Inside Iron Strapped Blocks, with Patent Roller Bushings—

5	6	7	8	9	10	inch.
Single, $1 25	1 50	1 75	2 50	2 75	3 50	each.
Double, 2 50	3 00	3 38	4 63	5 00	6 50	"

Plated Ware.—Rogers Bros.....dis 50 %
Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60&10 %
No. 3, Iron Pocket.....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 20&10 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....new net list
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 30 %
Rivets.—Black.....dis 50 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, dis 35 %

	13	13	14	14	15	16c ₱ lb

Rubber Moldings.—"Harmon's".....dis 10 %
No. 2, for Windows.....per foot, 5c
No. 3, for Doors.....per foot, 10c
No. 4, " .....per foot, 12c
Miller's Patent.....per foot, 4½c
Sad Irons.—Bliss & Drake.....₱ ½ 4c
Sand Paper.—0 to 2, $4 25; 2 to 3, $4 75.....dis 10 %
Saws.—*Hand and Panel—*
Wheeler, Madden & Clemson's, same list as "Disston's".....dis. 15&5 %
Disston's.....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts.....per ft., 37c
" " " "Star" X Cuts. " 60c
" " " Champion X Cut. " 50c
" " " One Man X Cut..each, $2 25
Boynton's genuine Lightning X Cut.....per ft., 50c
" " " One Man X Cut..each, $2 00
Circular—Wheeler, Madden & Clemson's.....dis. 25 %
Mill— " " " dis. 25 %
Screws.—Am. Screw Co., new list Sept. 1st.....dis 40 %
Aiken's.....dis 40 %
Scythe Stones.—
"Willoughby Lake," first quality.....₱ gross $6 50
" " second quality.....3 00
Shovels.—O. Ames.....dis 20 %
M. B. & D.....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England.....$6 50
Snow, Malleable Iron Tip, long Handle—Agents for New England.....5 50
Sifters.—Coal, Rice, &c.....$12 00
Spading Forks.—W. C. & Co.....dis 30 %
Stone Pickers.—"Partridge," original.....₱ doz $15 00
Tools.—Aiken's Pattern, 40 in set; Parr's.....$7 50 per doz
Traps.—Oneida.....dis 30 %
Blake's.....dis 30 %
Vises.—K. P. & Co.'s Solid Box. Blacksmith.....₱ lb 13c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 20 %
Wardrobe Hooks.—Wire to drive.....₱ gross $1 00
Weather Strips.—"Harmon's".....per doz $5, dis 10 %
Weights.—Window Weights.....₱ lb 1¾c
Wedges.—Axe.....₱ doz 35c
Wire.—
Eureka, in spools, No. 28 to 40 assorted...₱ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₱ ft 5c
Wrenches.—Genuine Wrenches, G. A. Cores..dis 40&5 %
Walton.....dis 50 %
Wringers.—

Novelty and Universal	Tub No. 2	Less than 2 doz	$72 00
		2 doz or more	70 00
Bench A		less than 2 doz	$86 00; 2 doz or more $84 00
" B		" "	94 00 " " 92 00
" C		" "	110 00 " " 107 00
Eureka		" "	60 00 " " 58 00

Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c.....dis 30 %

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.)

December 16, 1875.

Iron.—Best Refined Bar Iron		₱ ton	$52 50
"Burden Best" "		"	95 00
Swedish Bar Iron		gold "	110 00
Norway Shapes		gold "	122 50
Norway Nail Rods		gold "	130 00
Sheet Iron, American		₱ lb	4¼c
" " Galvanized		"	9 c
" " Russian		gold "	13½c
Plate Iron, C. No. 1		"	3½c
Iron Rails		₱ ton	$47 50
Steel Rails		"	72 50
Pig Iron, Foundry, No. 1 extra		"	25 50
" " No. 2 extra		"	23 50
" Gray Forge		"	21 50
" Scotch		"	30 00 @ 32 00
Wrought Scrap Iron		"	31 00
Old Rails		"	28 00
Steel.—	₱ lb	German	₱ lb 9 c
Eng. Tool, gold	15½c	Spring	8 c
American Tool	14½c	Tire	6 c
" Mach	9 c	Sleigh Shoe	4½c
Bessemer	7 c	Toe Calk	7 c
Tin Plates.—₱ box	gold	**Copper.**—	₱ lb
I. C. Char. 10x14	$7 75	Ingot	23½c
I. C. Coke 10x14	7 00	Bolt	30c
Char. Roof. IC. 14x20.	7 25	Sheathing	30c
Coke " IC, 14x20,	6 25	**Lead.**—	₱ lb
METALS.		Pig	7½c
Pig Tin.—	₱ lb., gold	Sheet & Pipe	8 1-10c
Banca	21c	**Zinc.**—Sheet	₱ lb 10½c
Straits	19½c	**Spelter**	₱ lb 7½c
English	19½c	**Antimony,** gold	₱ lb 13½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.....₱ doz., $7 75
Hudson's Rotary.....7 75
Axes.—Wm. Mann's, Red Warrior.....₱ doz $11 50
Wm. Mann's, W. Stewart's.....11 00
" C Marshall.....10 50
" Handled.....$5 extra
" Double Bitted.....11 50
H. L. B. & Co.'s, L. & Co.....11 50
" Pioneer.....12 00
" James & Co.....11 00
Hunt's.....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 15 & 5 %
Common Axles (Pat. Lubricating), 1¾ inch and upward.....₱ lb. 6½c.
do. less than 1¾ inch.....7 c.
Bellows.—Best St. Louis make.....50c ₱ in. net
Bells.—Troy, Church, School and Farm Bells..₱ lb 40c
"Improved Amalgam Bronzed." 15 in., $2 10; 17 in., $2 85; 19 in., $4 10; 21 in., $5 35.....dis 10 %
Belting.—"Boston Belting Co.'s Rubber.....dis 40 %
"Bradford & Sharp's" Oak-Tanned Leather.....dis 30 %
Bolts.—Metallic, Sectional, Bond's Patent.....dis 10 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 70&10 %
Arms, Bell & Co.'s Machine.....dis 40&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 2-& 10 %
Broad Fast Joint.....dis 3 &10 %
" Loose " .....dis 45&10 %
Reversible.....dis 40&10 %
" Japanned and Silver Tipped.....dis 45&10 %
Loose Joint "Acorn" " " " dis 45&10 %
Wheeling Hinge Co.'s W't Fast Joint Nar.....dis 30 %
" " " Broad.....dis 35 %
" " " Loose Joint.....dis 35 %
" " " Reversible.....dis 35 %
" " " Table & B'k Flaps.....30 %
Churns.—Julian, No. 2, $7 00; No. 3, $7 50; No. 4, $8 50.....dis 20 %
Cider Mills.
American Senior, $40 00; Am Junior, $25 00.....dis 20 %
Corn Drill.—Campbell's Patent.....each $35 00
Corn Knives.—Dunn E'ge T'ol Co.'s Chap...₱ doz 5 00
Seymour Mfg. Co.'s solid Steel Back.....4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—The Carver, 10 in. Saw, $4 a Saw..dis 15 %
12 in Saw, $4 50 a Saw.....dis 10 %
Crow Bars.—Steel Pointed.....₱ lb 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw.....dis 10 %
Robinson's Patent Sweepstakes Drag Saw.....dis 10 %
Fanning Mills.—Nash & Cutt's.....dis 20 %
Feed Cutters.—Improved Burdick No 1one!...dis 20 %
Sanford No. 1, $10 75; No. 2, $8 00.....net
Files.—Black Diamond, Mill.....$5 00 £ currency.
" Bastard.....5 00 £ currency.
" Taper.....5 00 £ currency
Forges.—Keystone Portable Forge Co.'s.....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 10 %
" " Handle d Hoes.....dis 30 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 15 %
" Planet Drill, Nos. 2 and 3.....dis 15 %
" Combined Drill and Wheel Hoe.....dis 15 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Bradford's French Burr Mills.....net list
Hammers.—Masons' Hammers.....₱ lb 30c
Smiths' Hand.....20c
Handles.—No. 1 Fork, Hoe and Rake.....dis 20 %
No. 2 Fork, Hoe and Rake.....dis 40 %
Harrow Teeth.—1 inch iron.....₱ lb 4½c
⅞ and ¾ inch iron.....4¾c
Barbed or Headed.....½c extra
Hay and Cotton Presses.—
Dederick's Railroad.....netl list
" Perpetual.....net list
Hay Knives.—
Dunn Edge Tool Co.'s.....₱ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent).....₱ doz $30 50
Hinges.—
Wheeling Hinge Co.'s Strap & T.....dis 33½& 10 %
Horse Hay Fork.—Nellis' Harpoon.....$9 00 net
Horse Nails.—National Patent Pointed.....20c rates
National Patent Pointed, extra finished.....22c "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Horse Rasps.—Heller Bros.....dis 45 %
"Black Diamond".....$6 00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern).....₱ keg, $5 50
" Mule....." 6 00
" Trotting Shoes....." 9 00
Treuegar Horse.....per keg $5 50
" Mule.....per keg 6 00
Hose.—
Boston Belting Co.'s Rubber Medium Sizes..dis 30&10 %
" " " Small Sizes, Hydrant.....dis 40 %
Ice Tools.—W. T. Wood & Co.'s Saws.....new list net
W. T. Wood & Co.'s Chest Hatchets.....new list net
" " Axes.....new list net
" " Loading Tongs.....new list net
" " Medium, Small and Family Tongs.....new list net
" " Chisels, Hooks and Grapples.....new list net
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks.....₱ doz $13 00 @ 13 50
" " Grub Hoes, oval eye....." 10 00 @ 11 50
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $33 00 net
Nails.—Wheeling Riverside Brand..$2 85 to $3 00 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 2 Plain.....dis 40 %
" " Round and Square.....dis 10&10 %
Picks.—Klein, Logan & Co.'s Railroad and Clay.....₱ doz $9 30 @ 11 00
Klein, Logan & Co.'s Coal....." 7 45 @ 9 40
" " Pick....." 12 00 @ 15 50
" " Stone....." 14 40 @ 14 90
" " Tamping....." 14 75 @ 15 25
" " Miners' Drifting....." 10 25 @ 12 90
Plows.—Avery's Cast and Steel.....dis 20 %
Collins Cast Cast Steel.....new list net
Pekin Steel.....dis 20 %
Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $25; No. 3, $22.....dis 30 %
Pulleys.—5 inch.....per doz $4 25 net
4 inch.....per doz 3 25 net
Nellis' Patent.....new list dis 10 &
Pumps.
St. Louis, Farm, Patent Metal Lined..new list dis 50 %
Rakes.—Paddock's Premium Sulky.....$29 00 net
St. Louis Revolving 14 tooth.....5 00 net
" " 16 " .....5 25 net
" Hand Hay Rake.....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis 40 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....$9 50 net
Cast Iron.....dis 10&5 %
Sad Irons.—Monitor Brand, Silver Polished..₱ lb 4½c
Sash Weights.—Standard Solid Eyes.....₱ lb 4c
Saws.—Curtis & Co.....dis 10 %
Scythes.—Dunn Edge Tool Co.'s.....dis. 30 %
Scythe Stones.—No. 1 Ind'n Pond ₱ gr's, $7 00
Extra Indian Pond.....7 50
Frenchman.....10 50
Diamond Grit.....12 00
Shovels and Spades.—H. M. Myers & Co.....dis 30 %
Grain Scoops, Pat. Cor'd Straps H. M. M. & Co...dis 30 %
" " " M. Rowland & Co.dis 30 %
" " " O. Ames & Son...dis 20 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₱ lb 15c
Solid Cast Steel.....25c
Spaths and Cradles.—Seymour Mfg. Co.'s..dis 30 %
Sorghum Machinery.—Bed Cane Mills.....dis 15 %
Scantlin's Seamless Evaporators.....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 12½ %
Blue Seat Springs.....dis 15 %
Vises.—Solid Box.....₱ lb 16c
Wilson Mfg. Co.'s.....dis 15 %
Wheelbarrows.—Champion Iron Wheel, ₱ doz $35 00
Champion Wood Wheel.....₱ doz $40 00
" Garden.....₱ doz. $40 net
Wrenches.—Coes' Genuine.....dis 33½&
Coes' Pattern.....dis 30
Wagons.—Whitewater Farm Wagons—
Thimble Skein.....No. 3, $44; ¼, $73; 3½, $79
Iron Axle.....No. 1½ $73; ¼, $81; 1½, $88

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellers & Co.)

Tin Plate.

IC, 10x14, Best Char.	$ 9 50	IX, 14x20, Roofing	$11 00
IX, 10x14, "	12 00	IC, 20x28, "	15 00
IC, 12x12, "	10 00	IX, 20x28, "	20 50
IX, 12x12, "	12 50	IC, 10x14, Coke	$ 9 00 @ 9 00
IC, 14x20, "	10 00	IC, 14x20, "	9 00
IX, 14x20, "	13 00	IC, 10x28, "	14 00
IC, 14x20, Roofing	9 00		

Usual difference for odd sizes.

Block Tin.

Large Pigs	25c	Bars	27c
Small " L. & F.	26c		

Sheet Zinc.

Casks	₱ lb 10½c	Sheet	₱ lb 11c

Solder.

No. 1, Refined, in bars or plate	17c
No. 2, " " "	15c
Pig Lead	7½c

Sheet Copper.—14 to 100 lbs. Sheets 30x60.....31c
10 to 12 lbs., " " and 30x72.....32c
6 to 9 lbs., " " 33c
Tinned, 14 and 16 oz. 14x48.....32c
Planished, 14 and 16 oz. 14x48.....36c
" No. 7, 8 and 9.....41c
Copper Bottoms.....44c

Sheet Iron.—	Com'n.	Sm'th.	Char'l.	Ju'ta.
No. 16 to 20	4¼c	4¾c	6¼c	7¾c
No. 22 to 24	4¼c	4¾c	6¼c	7¾c
No. 26	4½c	5 c	6½c	8 c
No. 27	4¾c	5¼c	6¾c	8¾c

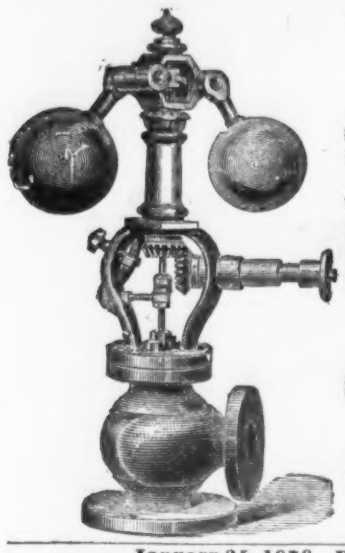
Galvanized Iron.....dis 30 %
Iron Rivets.....dis 20 %
Iron Wire.....dis 35 %
Coppered Bail Wire.....dis 40 %
Copper Rivets and Burs.....dis 40 %
Genuine Russia Iron......dis 40 %
Perfect—No. 9, 10, 11, 12.....per lb. 17c
Stained—No. 9, 10, 11, 12.....per lb. 16c
Tare 22 lbs to Bdle. For less than 1 Bdle. add 1c. ₱ ₱
Refitined Stamped Ware.....dis 40 %

CHICAGO.

(Reported by Frank Sturges & Co., 73, 74 & 76 Lake St.)

January 25, 1876.

Tin Plate.—		14x20, IX, Ch'l Best	$12 00
10x14, IC, Ch'l. Good	$ 8 50	14x20, IXX, " "	13 50
10x14, IC, " Best	9 50	14x20, IXXX, " "	15 00
10x14 IX, " "	12 00	DC, 100 Plate, " "	9 50
12x12, IC, " "	10 00	DX, " "	14 00
12x12, IX, " "	12 50	DXX, " "	16 50
14x20, IC, " "	10 00	DXXX, " "	17 00
Roofing IC, Charcoal, Best			9 00
Roofing IX, Charcoal "			11 50
20x28, IC, Charcoal Roofing, Com			13 00
20x28, IC, " Good			15 50
20x28, IC, " Best			19 00
20x28, IX, " "			23 50
10x14, IC, Coke Plates			8 50 to 8 75
14x20, IC, "			9 00 to 9 50
10x20, IC, "



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We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

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ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

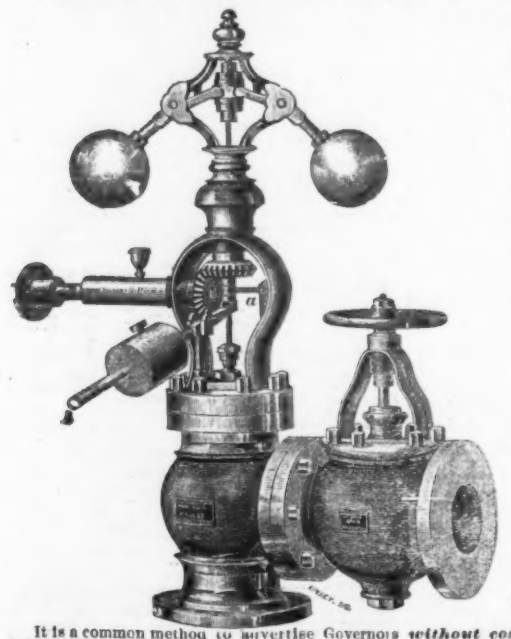
Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

January 25, 1876. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Plain or Bright Finish, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	PRICE. Plain.	Bright Finish.	Lever Attachment for altering speed.	Improved Stop Valve.
¾	17·00	19·00	1·90	..
⅞	19·00	21·00	1·90	..
1	21·00	24·00	2·00	5·00
1¼	25·00	28·00	2·25	6·00
1½	29·00	33·00	2·50	8·00
2	35·00	40·00	2·75	10·00
2¼	42·00	48·00	3·25	14·00
2½	45·00	51·00	3·50	15·00
2¾	49·00	56·00	3·75	17·00
3	55·00	63·00	4·25	20·00
3½	64·00	73·00	4·50	25·00
4	74·00	84·00	5·00	30·00
4½	83·00	97·00	5·50	36·00
5	94·00	106·00	6·00	42·00
5½	113·00	125·00	6·50	48·00
6	125·00	138·00	7·00	54·00
7	150·00	165·00	8·00	68·00
8	185·00	202·00	9·00	80·00
9	205·00	225·00	10·00	..

No Charge for Boxing & Cartage.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

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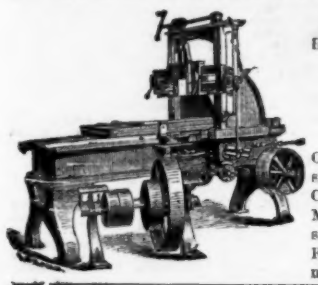

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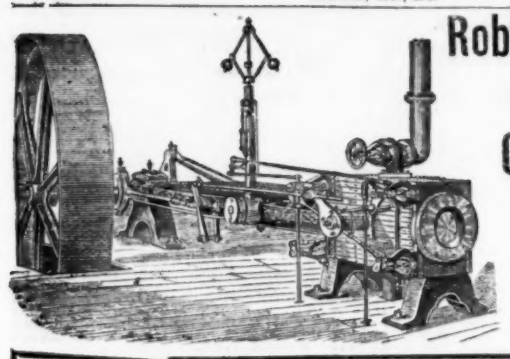

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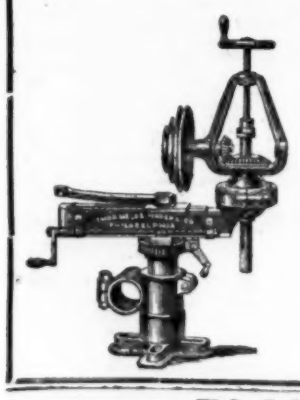

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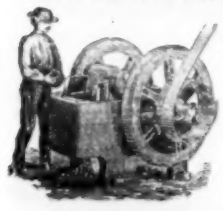

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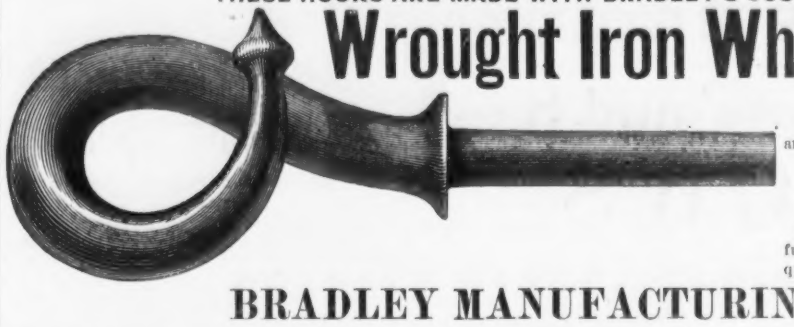

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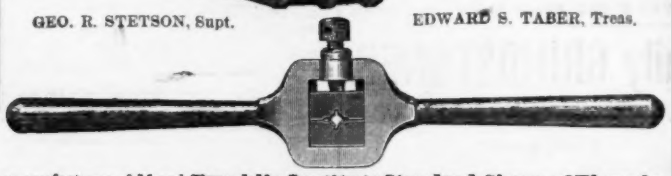

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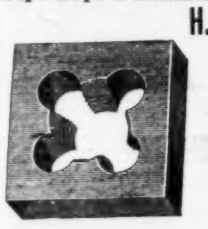

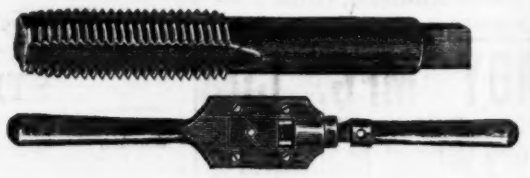

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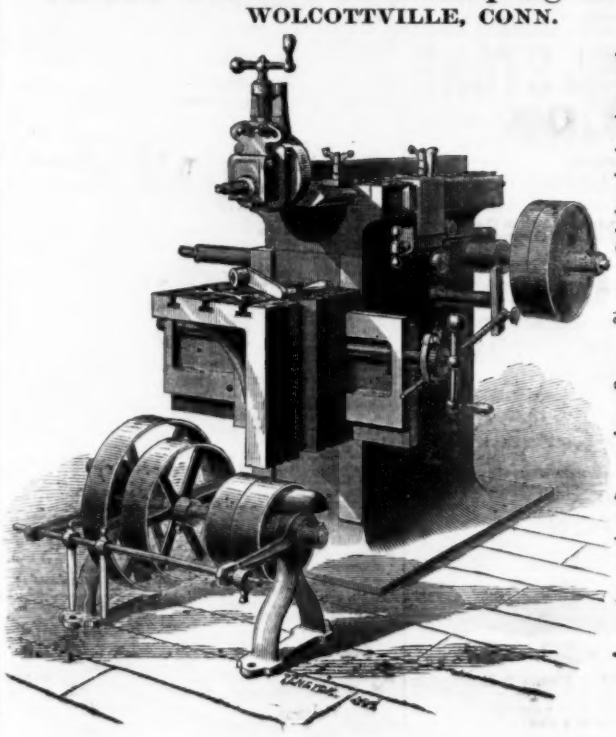

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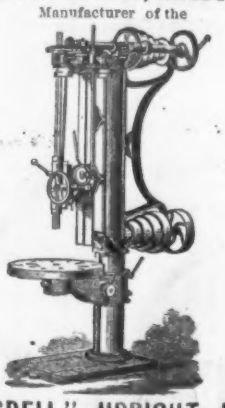

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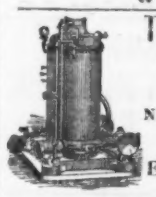

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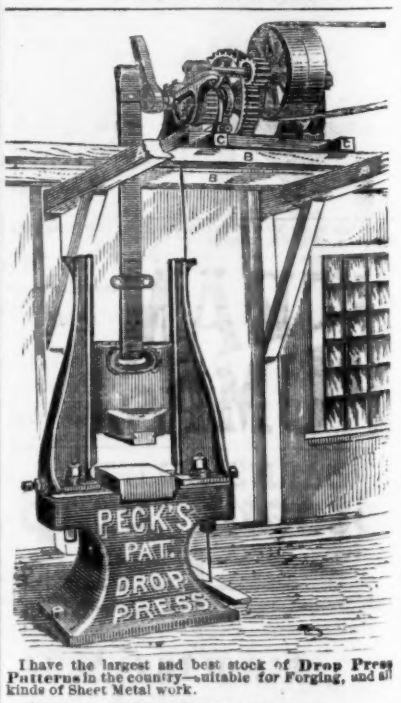

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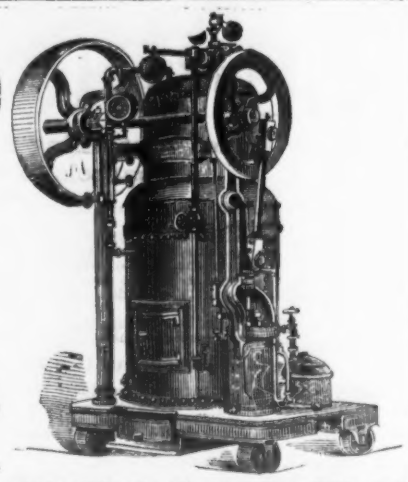

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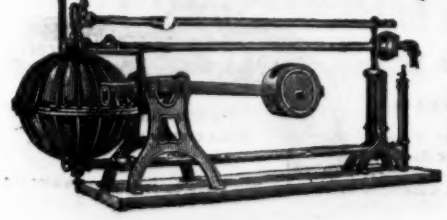

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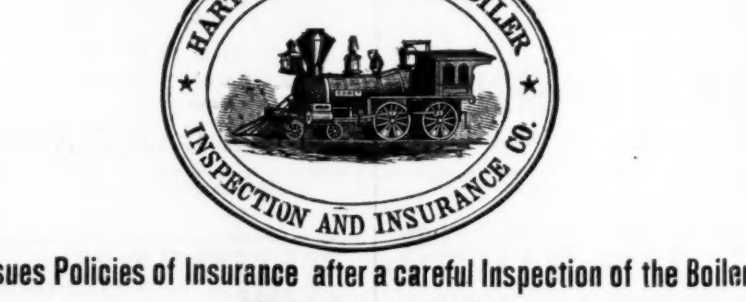

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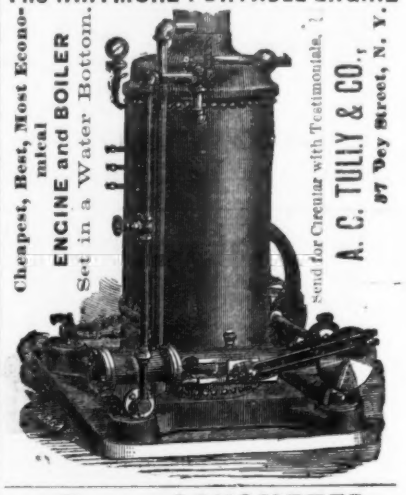

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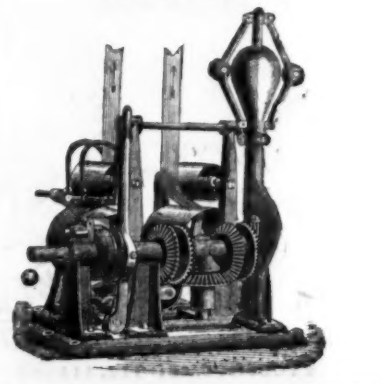

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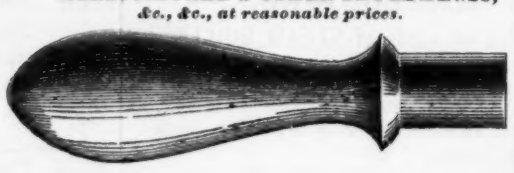

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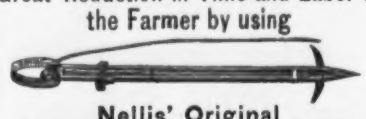

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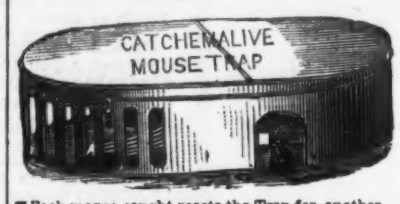

Each mouse caught resets the Trap for another.

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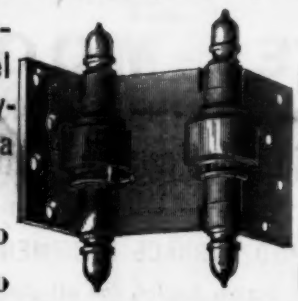

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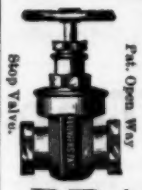

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